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MACHINE WARFARE

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MACHINE WARFARE

An Enquiry into the Influences of Mechanics on the Art of War

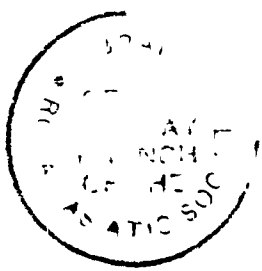
by

MAJOR-GENERAL J. F. C. FULLER

106721

"We are greater than the Peoples or the Kings—
Be humble, as you crawl beneath our rods!—
Our touch can alter all created things,
We are everything on earth—except the Gods!"
—*Kipling.*

With 14 Diagrams



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TO

S. L. A. MARSHALL

THIS BOOK IS PRODUCED IN COMPLETE CONFORMITY WITH THE AUTHORIZED ECONOMY STANDARDS.

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PREFACE

"The alternatives now are to stand fast or to go under—there is no middle course. The only moral that the logic of things permits to us now is that of a climber on the face of the crag—a moment's weakness and all is over."—*Oswald Spengler.*

THIS IS A BOOK OF IDEAS AS WELL AS OF MACHINES. TO HAVE written it in full would have required several volumes, therefore, in these days of paper shortage, it has been compressed into one. The subject it covers is vast, because war cannot be divorced from peace, and therefore from politics, economics, finance, culture, etc. In my opinion, why war has been so little understood by us, and in consequence why we were so ill prepared—mentally even more so than materially—to face the present conflict, is that we failed to grasp this. War to-day is total, therefore it includes everything, therefore it influences everything, and therefore, in turn, it is influenced by everything. There are such things as a religion of war, a philosophy of war, an ethics of war, a science of war, an economics of war, a mechanics of war and an art of war. War is not fisticuffs only, because war is no more and no less than living violently instead of argumentatively.

As war is a human activity, and as no one man is exactly like another, there are as many outlooks on war as there are men; though, as most men are human sheep, their opinions are more often than not mere bleatings. Therefore, I think, it is as well very briefly to set down my own outlook—philosophical, political and military.

Condensed to its utmost, the first may be expressed as follows:

The bottom is top. The material has been exalted above the spiritual; the canaille has ousted the nobility; truth is exorcised and lies are revered, the world is standing on its head.

Oswald Spengler called this age "The time of Contending States." Listen to him

"For us this time of Contending States began with Napoleon

and his violent-arbitrary government by order. His head was the first in our world to make effective the notion of a military and at the same time popular world-domination. . . . But *ipso facto* this second century [the twentieth] will be one of *actually* Contending States. *These* armies[1] are not substitutes for war—they are *for* war, and they want war. Within two generations it will be they whose will prevails over that of all the comfortables put together. In these wars of theirs for the heritage of the whole world, continents will be staked. . . ."

My political outlook on war—creed I have none—is that of Clausewitz, and therefore intimately related to Napoleon and the above philosophy. Even before the last war I clearly saw that wars must express the character of their varying periods and as the age in which we live is an industrial one, armies must inevitably become industrialized, and in spite of the fact that our parliamentary system of government has remained unrationalized. That is, developed as it was during an agricultural civilization, it never adapted itself to the needs of an industrial order.

When the last war was proclaimed to be at an end, I sensed that, in the actual, it was still in its initial stage; because, in the circumstances of a dictated peace, the Armistice of November 11, 1918, was in fact monkey-glanded. The "peace" was a war-pause and nothing more. To me this again was inevitable, because I could not see how peace could be established by other means than those of negotiation. All former peaces had been negotiated, yet this one of Versailles was signed at the pistol point. Therefore it was no peace at all; instead a peaceful blank file—the parading of a political nonentity.

In these circumstances I was opposed to the whole conception of the League of Nations, which I held and still hold to be nothing other than a bankers' racket. If ever there was opium for the people it was in this soft-drink of universal brotherhood gulped down between mouthfuls of hypocrisy, the political buns handed around to us by the Baldwin and Macdonald administrations. Benjamin Disraeli once said: "Men are governed by words." Between 1919 and 1939 we were hypnotised by them: we walked in a trance, while the world turned round. Somnambulistically we prepared to commit suicide.

[1] Spengler's idea is: "The place of the permanent armies as we know them will gradually be taken by professional forces of volunteer war-keen soldiers; and from millions we shall revert to hundreds of thousands." Though my argument differs, my idea is the same: mechanization will force the small army to the fore by rendering the mass army useless. The age of the *condottiere* will return.

From 1930 to 1939 I travelled much on the Continent, meeting many soldiers and statesmen as well as the heads of several States. In these wanderings I discovered something very different, and when related to our unreality something very real. In the main the nations, and more particularly those which had suffered most during the last war, were not aiming at a Bankers' Paradise, but instead at getting out of Hell, even if the next step took them straight into Purgatory. Their outlook was amoral, because they had been treated immorally. It was autocratic, because they had been reduced to servility. And it was militarist, because, having been denied goodwill, they saw in violence a means of escape.

Travelling as I did among them, I saw much that seemed to me to be good and much that appeared to be evil. At least they had their eyes fixed on the future and not on the past—that is, if not necessarily in the most comfortable, anyhow in the inevitable direction. To suggest that we should watch these nations, interest ourselves in them and when their ideas seemed good modify our antiquated way of life, I soon discovered was to sin against the British Holy Ghost, who apparently lives most of his time in Threadneedle Street. To suggest, as I did, time and again, that our army should be mechanized on the lines of the Russian, was to be proclaimed a Bolshevik—then a term of infinite opprobrium, though now one of Christian significance. To hint that there appeared to be much of worth in Mussolini's Corporate State was to be dubbed a Fascist—to-day in evil intent equivalent to Papist in the seventeenth century. To whisper that, minus their politics, the Hitler Youth and Labour Camp Organizations in Germany seemed highly democratic, was to be damned as a Nazi and risk getting lynched. In truth, between the years 1919 and 1939, there was no limit to the political imbecilities of my fellow-countrymen, who revelled in expletives, though they had a horror for direct action. From their armchairs, at the slightest provocation, they bellowed war, while on their parade grounds the soldiers they paid for were still sticking bayonets into sacks filled with straw. It was like living in a lunatic asylum.

As regards politics, may I say this—I have none. All politicians, whatever their clamour or creed, are anathema to me. And as for Parliaments, Houses of Representatives, Congresses, Reichstags, Grand Councils and such-like talking shops, my opinion is that were they all closed down the world would be a happier habitation. If it can be called a political system, the one I reluctantly advocate in this Age of Contending States is that of an Army raised to a national footing, in which the Prime Minister is Commander-in-Chief, and the Cabinet his Staff; Members of Parliament representing the subordinate commands, whose constituencies, like the

arms of an army—infantry, artillery, tanks, etc.—are organized according to their functions.

Having divulged my secret, I suppose I shall now be proclaimed to be a Totalitarian. Anyhow, it must be conceded that, as this is a total war, such folk should not altogether be despised. Writing in *Action*—the organ of the British Union—of June 10, 1939, I said: "If we are to beat Germany, we have got to become Totalitarian, lock, stock and barrel, because from the moment the first gun goes off, willy-nilly we shall have to set out on that road." I have sometimes wondered whether this was not one of the reasons why a year later that paper was suppressed. Anyhow, much of its thunder would since seem to have been stolen by the Opposition.

Though, from my contact with foreign nations I was fully aware that, sooner or later, another world war was a certainty, I considered it the height of folly for my own country to get involved in a life or death struggle before (1) our foreign policy had succeeded in placing us in a sounder strategical position, and (2) before we could support the French with an army at least equivalent in quality to the German.

As regards the first, my views were that it was essential for us, before becoming involved in war, to rectify the enormous blunder we made in 1935, when, with the fanaticism of a suicidal maniac, we drove the unwilling Mussolini into the arms of Hitler;[1] because it was vital in another war that the command of the Mediterranean should remain ours.[2] Even had France been healthy, this would still have remained good. But, as things were, France was rotten to the core, and above all her people not only feared war, but did not want it. Nevertheless, in England, though the Foreign Office had every facility of discovering the truth, the opinion held in and out of Parliament is the one to be found in that generally well-informed News Sheet—*Review of World Affairs*:

> "The condition of the [French] army remains excellent. The spirit of both men and officers is beyond praise, and the efficiency of the force is of the first order. Compared with all other armies, the French is, of course, streets ahead. Our observers

[1] On October 7, 1935, when on my way to Abyssinia, I had an interview with the Duce in Rome. This is what he said to me: "You English must be mad. Our two countries have for centuries admired each other, and we are the only two peoples in Europe who have never as yet fought one another. Now, for a slave-driving nigger you threaten me with economic sanctions. Is not that madness?"

[2] At about this time I remember saying to a friend: "Should in the near future the British Empire be involved in war, and should it collapse, the true date of its demise will be fixed as November 18, 1935, when economic sanctions against Italy were applied."

spoke with a member of one of the official parliamentary Commissions recently watching army training, and the report given was most encouraging. From the highest staff officer, to the newly joined recruit, the French army can be given full marks."

This comic cut was published on January 25, 1939; nevertheless, well after the war had started the myth persisted. For example, Sir Ronald Storrs in his *The First Quarter*—published in 1940—writes:

"The quality of the French Army was very high. In the opinion of competent neutral judges it was the best in Europe, thanks to the excellent training of its officers and n.c.o.s, and the intelligence, patriotism, endurance, and dash of its rank and file . . . its equipment was up to date. . . ."

What did these competent experts think of the German Army? This:

"The German army of to-day is not to be compared with that of 1914: the physique of the men is not so good; the standard of non-commissioned officers falls far short of the 1914 standard, while naturally there is a shortage of highly trained Staff officers." (*Review of World Affairs*, January 25, 1939.)

"Their Commander-in-Chief was General von Brauchitsch, professionally competent but, by common consent, a less talented and independent figure than General von Fritsch, who had lost the Führer's favour, or General von Blomberg. The Chief of the General Staff was General Keitel, something of a 'yes-man' in his attitude towards Herr Hitler, and not up to the standard of his predecessor, von Beck." (*The First Quarter.*)

My own views, based on personal observation and contact, were diametrically the opposite.[1] The physique of the German soldier

[1] I received the following letter from an acquaintance on July 3, 1940: "I suddenly remembered the last occasion we met [1938] at the Empire Crusade Club. You then told the audience that the French Army was not much good and that the German army was very good indeed. I disagreed with you utterly.

"Events have since shown how entirely right you were and how completely wrong I was. So I am writing this letter to apologise to you for not listening to your words of wisdom."

On September 2, 1939, I wrote in *Action*: "What will the French do? I am no prophet, yet I suggest they will sit in the Maginot Line, snip up *La Vie Parisienne*, decorate their dugouts with very unsatisfying young ladies, and then want to go home."

was excellent, and the suggestion that there was a shortage of trained Staff officers was pure bunkum, because long before Hitler attained power Germany had the finest corps of staff officers in the world, though they were not graded as such.

As to the generals, I can say this: though I never had the pleasure of meeting General von Brauchitsch and General Keitel, they seem to have done very well in this war. Generals von Blomberg, Beck and von Fritsch I met on several occasions, on manœuvres and elsewhere. The first two I found to be moderately progressive, and of the third I will say no more than this, as I do not want to do a gallant and now dead soldier an injustice—to me he certainly appeared to have come straight out of the Battle of Vionville.

I will turn now to ourselves.

Casting my mind back over those arid years 1919–1939, I can think of only three men, prominent in the public eye, who again and again urged us to mechanize our fighting forces and prepare for Armageddon. These three were, the first Lord Rothermere, Mr. Winston Churchill and Sir Oswald Mosley. The first is dead, the second is Prime Minister, and the third is in jail.

Sir Ronald Storrs tells us that, as the crisis approached, "Great Britain was infinitely more ready for war than she had been in 1914–15. . . ." She was nothing of the sort. In 1914 the army we put into the field was the best equipped that ever left these shores, and the army of 1939 probably the worst, for it was a go-between fighting force, neither one thing nor the other. True, the horse had disappeared and the tractor had come in its stead, yet it was in no sense of the word mechanized. Though much money had been spent on experiments—so much that there were nearly as many experimental tanks as fighting ones—all that these twenty years of travail had brought forth was the light tank, a kind of mechanical mouse. I had fought this toy since its conception, and had watched its frolics in both Abyssinia and Spain. As regards its comic turns in the second of these countries, I wrote as follows in *The Times* of April 8, 1937:

> ". . . this war has, I think, proved that the light tank is not really a combat machine at all. It is an indifferent armoured scout . . . in a broken country it is like a destroyer in a rough sea . . . the room it affords its crew is so restricted that, when in it, a man feels as if he were in a mobile coffin."

This was the sole type of tank Sir Ronald Storrs' "infinitely more ready" army took out with it to France in September, 1939. Not a single medium machine accompanied it, for the last model

had been issued in 1923 and was literally falling to pieces! I believe a new model, which had been discussed over a period of ten years, was actually on the stocks. It was called the "Infantry Tank" and was purposely *geared down* so that it *should not run away* from the foot on the battlefield. In fact, like a horse turned out to grass, it was hobbled.

As our mechanical mouse was bunkered by a ditch any child's pony could leap over, I invented an automatic tank bridge which would enable it to cross a trench of any depth and up to 25 feet in width. As this seemed to me a useful improvement, I had a working model of the contrivance made, and showed it at various times to one M.G.O., one C.I.G.S. and one Director of Mechanization. I was in no way surprised that it was turned down, but what did surprise me was that I was given *carte blanche* to dispose of my invention as I liked. So, had I wished, I could have taken it to Germany, and had I done so and had it been accepted, it would certainly have enabled our enemy's light tanks to negotiate with ease the dykes at Dunkirk.

Nothing could shake us out of our lethargy, nor did we want to be shaken out of it. The night before I left this country to attend Herr Hitler's 1939 birthday celebrations, I was called up by a Foreign Office Official. I expected he would ask me to note what kinds of tanks, etc., were shown in the great military parade which was to be held on April 20. No, instead, this is what he said:

> "I understand you are attending Hitler's birthday, and so thought it as well to tell you that Sir Ian Hamilton was also asked; but that we have warned him against going as it might prove dangerous."

My answer was: "So far as I am concerned, I rather enjoy a rough house."

At such functions as the birthday of the head of a great nation—in this case over seventy foreign guests were present—the amount of information to be picked up is considerable. I heard that Hitler intended to have Danzig, war or no war, and that, if it came to war, Poland would be over-run in a minimum of three weeks or a maximum of six, that there would be no German attack on the Western Front, and no bombing of French or English cities, and that Italy would probably remain neutral. In the Adlon I met an unusually well-informed American. I asked him what he thought of our guarantee to Poland. His answer was:

> "Well, I guess your Mr. Prime Minister has made the biggest blunder in your history since you passed the Stamp Act."

On the morning of April 20 the great parade took place. For some three hours a completely mechanized and motorized army roared past the Führer along the Charlottenburger Strasse. Never before or since have I watched such a formidable mass of moving metal. That afternoon all foreign guests were lined up in the new Chancellery to meet Herr Hitler. He walked down the line, and when he came opposite to me he shook me by the hand and said: "I hope you were pleased with your children?" To which I answered: "Your Excellency, they have grown up so quickly that I no longer recognize them," which was true.

When I came back to England and mentioned what I had seen, this is what happened:

> "With this they looked upon him, and began to reply in this sort: SIMPLE said, *'I see no danger'*; SLOTH said, *'Yet a little more sleep'*; and PRESUMPTION said, *'Every vat must stand upon his own bottom.'* And so they lay down to sleep again, and Christian went on his way."

This somewhat lengthy and personal background I venture to suggest is not altogether unimportant, because in miniature it shows where our past weaknesses are to be discovered and in consequence where our present difficulties are to be sought. Yet it in no way condemns us, because we are a very adaptable people. For instance, the bulk of the 12,000,000 voters who, in 1935, supported the Peace Ballot, was thoroughly pacific; nevertheless four years later it was thoroughly bellicose. Though in 1939 the Socialists voted against the conscription of men, this year—1941—many are urging the conscription of women. We, therefore, are what may be called a "pliant nation"—that is, a people who can rapidly be moulded. Consequently it seems to me what above all things we are wanting to-day is a victory mould; because, once it is fashioned, all that our leaders need do is to squash us into it. Politically speaking, we are the world's champion opportunists.

To fashion this mould many ingredients are required, and among them is the understanding of machine warfare, which, in turn, demands an understanding of the character of the machine age in which we live. In order to assist in this, I have divided my book into three parts, or really volumes, in which the opening chapter of each is an introduction to the remaining five. In turn, Part One is an introduction to Part Two, and Part Two is the pedestal upon which Part Three stands.

As regards the opening chapter of Part One, I have adopted the somewhat unusual course of relying almost entirely on quotations. My reasons are (1) I am not a recognized authority upon what may be called the "natural history of the machine," whereas Mr. Lewis

Mumford is; and (2) because I am in such complete agreement with his views that it would be an impertinence on my part to paraphrase them.

His book, *Technics and Civilization*, more clearly reveals the influence of the machine on the social order than any I have so far read. Though, no doubt, many will disagree with Mr. Mumford's conclusions, they cannot be ignored.

To skip to Part Three. Here my difficulties have been those faced by every writer on the war—namely, to discover what has really happened. No past age has been so prolific in lies, and as in the present one lying has been mechanized by the radio, more so than armies have been by the petrol engine, truth has been whittled away into virtual nothingness.

I regret to say that I have barely touched upon this the vilest form of machine warfare, generally called "propaganda," and the reason is that I have already crammed so much into this small volume that such space as I might have allotted to it would have been quite inadequate. Further, because I know it best, I have considered it more profitable to concentrate upon machine warfare on land.

Turning to Part Two, I can truthfully say that there is not an idea in it which is not to be found in one or other of my pre-war writings, in fact much of it has been extracted from my *Lectures on F.S.R. III, Operations between Mechanized Forces*

The history of that book is of some interest. In 1929–1930, when a Brigade Commander, I made use of the long winter evenings to give my officers a series of lectures on Volume II, *Field Service Regulations*, which covers operations. Then, realizing how difficult it is to develop from that Training Manual—written for a non-mechanized army—the theory of mechanized warfare, I wrote a series of lectures on a mythical Volume III—future operations. These lectures were not given, because in 1930 I was promoted and never again employed.

Lectures on F.S.R. II were published in 1931 and were well received both in this country and abroad, whereas *Lectures on F.S.R. III*, which appeared in 1932, though well received abroad, were all but entirely ignored at home.

In France no notice was taken of these lectures. In Italy many reviews appeared on them. In Spain a translation was published in 1933 under the title *Operaciones Entre Fuerzas Mecanizadas*, and in 1935 a Czech translation—*Operace Mechanisovaných Vojsk*. Whether there was a German translation I do not know for certain, though I believe there was. Anyhow, a German edition of my *Memoirs* was published, and they contain a chapter on "Plan 1919," which is the idea behind the whole system.

By chance I learnt that a Russian edition appeared in 1932. That year I met Karl Radek in Geneva, and after shaking me by the hand and acclaiming me to be a "brother revolutionary," because I thought in terms of the future, he informed me that a first edition of it, numbering 30,000 copies, had just appeared in his country.

Though the influence of these lectures on the British Army was nil, they appear to have been closely studied in both Germany and Russia. This at least in part is corroborated by the following two letters.

In July, 1940, a soldier friend of mine was given the task of escorting to this country a party of Czechs. On August 4 he wrote to me as follows:

> "I think you will be interested to hear that your book [*Lectures on F.S.R. III*] was the standard work on which Mechanical Warfare was taught at the Czech Staff College. A high Czech officer who travelled home with me said: 'The Germans regard this book on Mechanical Warfare as their Bible, and the entire attack in France and Flanders was based on his teaching'."

Three months later, on October 19, I received a etter from a stranger, a retired officer who, apparently, knew Russia at first hand. Here is an extract from it:

> "You are probably aware that until warfare improved on it, in actual practice the Red Army looked on you as the greatest expert on tank handling. Their practice since is not so much to discard your teaching but to build even higher on that base from study of warfare of to-day, and from experience in Finland, Manchuria and Mongolia."

I have included these extracts not to flatter myself, but instead as a warning. We English suffer from a marked superiority complex. To us it seems almost an insult to our intelligence to suggest that we can learn anything from the foreigner. Yet foreigners are only too ready to learn from us. This is what Herr Rauschning quotes Herr Hitler as once having said:

> "I have always learnt a great deal from my opponents. . . . The man who is not ready to learn from his enemies, and from them above all, is a fool. Only a weakling will be afraid of losing his own inspiration by studying his enemy."

Though a war is only truly won when its peace aim is accomplished, the means whereby military victory is attained are not

forged on the battlefield, but in the study. What would we think of a physician who was so conceited as to refuse to learn from a foreign practitioner? Then, what can we say of a soldier who imitates such a fool?

To-day we are not only fighting for an ideal, which history alone can pronounce to be good or bad, but, what more immediately concerns us, for our existence. The means of winning this fight are many—political, financial, industrial, moral, etc. Yet, among them, not the least important is the use we make of our fighting strength, and to-day this mainly depends on our knowledge and understanding of machine warfare.

On November 20, 1917, at the Battle of Cambrai, it was not numbers of men which won us a startling success; instead, it was a novel tactical idea. So also to-day it is not masses of men or masses of machines which are going to repeat the trick, instead it is yet another idea.

With all due respect to the great Duke of Wellington—if he ever uttered the words—this war is not going to be won on the playfields of Eton. It will be won either by brute force, by economic or moral collapse, or by craft—that is, by totally new tactics, as new to the Blitzkrieg as Cambrai was to the Sitzkrieg, the war of trenches. Its laboratory is the study and its alembic is criticism. Once Victor Cousin, the French philosopher, said: *"La critique est la vie de la science."* So also is criticism the life of war.

Much criticism will be found in this book, not because I am so presumptuous as to suppose that everybody except myself is in the wrong; but because I am certain that, until we criticize ourselves and our enemies, creatively and not merely destructively, let alone abusively, we shall never begin to win this war by that cheapest and speediest of all ways—namely, by craft.

November 31, 1941. J.F.C.F.

ACKNOWLEDGMENTS

I am much indebted to Messrs. Routledge & Sons and Messrs. Eyre & Spottiswoode for their permission to quote from Mr. Mumford's *Technics and Civilization* and Herr Rauschning's *Hitler Speaks*.

PART ONE

MACHINE WARFARE IN DEVELOPMENT

"War, like a neurosis, is the destructive solution of an unbearable tension and conflict between organic impulses and the code and circumstances that keep one from satisfying them."—*Lewis Mumford.*

Chapter I

THE MACHINE AGE

WHEREAS THE ANIMAL IS SLAVE TO ITS ENVIRONMENT, MAN—WHO should be master of his fate—is more frequently than not serf to his own ideas and inventions. Throughout his history—recorded and unrecorded—he has been a tool-using creature. As Carlyle exclaims: "Without Tools he is nothing, with Tools he is all."

His earliest tools were weapons of war, so also are many of his latest. And though club, axe and spear differentiated him physically from the animals he hunted and killed, he remained at heart an animal, and still remains so, in spite of the fact that those primitive weapons have given way to more cunning and lethal instruments.

This great change-over from hand to machine weapons, though of hidden origin, dates visibly from the introduction of cannon in the fourteenth century—that is from the invention of the first one-cylinder internal combustion engine. By means of it man changed the whole order of his society, entering what is better described as the Machine than the Modern Age.

Weapons which consumed iron by belching it forth stimulated mining, which in turn stimulated wealth. So it came about that

the iron seekers were soon followed by the gold hunters, and as bullion poured in from the New World, wars became both more important and extensive. War industries then took form, arsenals were built and men by the tens of thousands were regimented. In the seventeenth century arms factories were established in Sweden, Russia, and France, until towards the close of the eighteenth mass production of military equipment began to create the present-day mass armies.

Thus war not only stimulated existing industries but simultaneously created new ones, opening up vast prospects for capitalist enterprise, which, as machine power developed, demanded a rapid turn over of manufactured goods in order to maintain regular profits.

The whole of this subject—the influence of munitions and military organization on industry and finance, and in turn the influence of industry and finance on social life—has been traced in so masterly a way by Lewis Mumford in his book *Technics and Civilization*, that in the remainder of this chapter I will leave it to him to explain how it is that a mechanized society must inevitably lead to war.

It is of vital importance that this should be clearly understood, because in 1939 it was not Germany, or France, or Poland or Great Britain who, singly or unitedly, were responsible for the outbreak of the Second World War; instead it was that form of civilization which sprouted out of the Industrial Revolution. Unless this is grasped, the causes of that war will remain hidden. Further, until they are revealed, examined, and eliminated, whichever nation or group of nations is victor, the sole outcome can be no other than a repetition in different form of the years 1919–1939, and then a third world upheaval and so on until the poison is ejected.

Turning to the capitalist system of production, Mumford points out that, as profit is its sole motive, the consumption and turnover of goods must not be retarded, and as such "brakes on production" are automatically excluded from an army, an army in war is the ideal consumer, because "it tends to reduce toward zero the gap in time between profitable original production and profitable replacement. The most wanton and luxurious household cannot compete with a battlefield in rapid consumption."

Then he continues:

> "Mechanized warfare, which contributed so much to every aspect of standardized mass-production, is in fact its great justification. Is it any wonder that it always acts as a temporary tonic on the system it has done so much to produce? Quantity production must rely for its success upon quantity consumption; and nothing ensures replacement like organ-

ized destruction. In this sense, war is not only, as it has been called, the health of the State; it is the health of the machine too. Without the non-production of war to balance accounts algebraically, the heightened capacities of machine production can be written off only in limited ways: an increase in foreign markets, an increase in population, an increase in mass-purchasing power through the drastic restriction of profits. When the first two dodges have been exhausted, war helps avert the last alternative, so terrible to the kept classes, so threatening to the whole system that supports them."

As capitalism grew in power, civilization took on a mechanistic as well as a materialistic form, machines in the eyes of the manufacturers and those who financed them becoming more valuable than the men who served them, and who were rapidly reduced by their masters—the machines—to the status of a standardized proletariat. Thus not only were the seeds of class-war sown within the social order, but industry itself took on a warlike form. This, in 1835, was made clear by Andrew Ure in his *The Philosophy of Manufacturers*:

"The present is distinguished from every preceding age by an universal ardour of enterprise in arts and in manufactures. Nationals, convinced at length that war is always a losing game, have converted their swords and muskets into factory implements, and now contend with each other in the bloodless but still formidable strife of trade. They no longer send troops to fight on distant fields, but fabrics to drive before them those of their old adversaries in arms, to take possession of a foreign market. To impair the resources of a rival at home, by underselling his wares abroad, is the new belligerent system, in pursuance of which every nerve and sinew of the people are put upon the strain."

The influence of this militarization of industry on the social order was all-embracing, as will be seen from the following extracts from *Technics and Civilization*:

Serfdom to the Machine.

"To live was to work: *what other life indeed do machines know?* Faith had at last found a new object, not the moving of mountains, but the moving of engines and machines. Power: the application of power to motion, and the application of motion

to production, and of production to money-making, and so the further increase of power—this was the worthiest object that a mechanical habit of mind and a mechanical mode of action put before men."

The New Barbarism.

"There was a sharp shift from life values to the pecuniary values: the system of interests which only had been latent and which had been restricted in great measure to the merchant and leisure classes now pervaded every walk of life. It was no longer sufficient for industry to provide a livelihood: it must create an independent fortune: work was no longer a necessary part of living: it became an all-important end. Industry shifted to new regional centres in England.

"A landless, traditionless proletariat, which had been steadily gathering since the sixteenth century, was drawn into these new areas and put to work in these new industries: if peasants were not handy, paupers were supplied by willing municipal authorities: if male adults could be dispensed with, women and children were used. These new mill villages and mill towns, barren of even the dead memorials of an older humaner culture, knew no other round and suggested no other outlet, than steady unremitting toil. The operations themselves were repetitive and monotonous; the environment was sordid; the life that was lived in these new centres was empty and barbarous to the last degree.

"Here was something almost without parallel in the history of civilization: not a lapse into barbarism through the enfeeblement of a higher civilization, but an upthrust into barbarism, aided by the very forces and interests which originally had been directed toward the conquest of the environment and the perfection of human culture."

The Degradation of the Worker.

"The first requirement for the factory system . . . was the castration of skill. The second was the discipline of starvation. The third was the closing up of alternative occupations by means of land-monopoly and dis-education.

"Reduced to the function of a cog, the new worker could not operate without being joined to a machine. Since the workers lacked the capitalists' incentives of gain and social opportunity, the only thing that kept them bound to the machine was starvation, ignorance and fear. These three conditions were the foundations of industrial discipline.

"The gospel of work was the positive side of the incapacity for art, play, amusement, or pure craftsmanship which attended the shrivelling up of the cultural and religious values of the past. In the pursuit of gain, the ironmasters and textile masters drove themselves almost as hard as they drove their workers. . . . If the labourers were crippled by the doctrine, so were the masters.

"For a new type of personality had emerged, a walking abstraction: the Economic Man. Living men imitated this penny-in-the-slot automaton, this creature of bare rationalism. These new economic men sacrificed their digestion, the interests of parenthood, their sexual life, their health, most of the normal pleasures and delights of civilized existence to the untrammelled pursuit of power and money."

The Struggle for Existence.

"The labourer sold himself to the highest bidder in the labour market. His work was not an exhibition of personal pride and skill but a commodity, whose value varied with the quantity of other labourers who were available for performing the same task. . . . Similarly, the manufacturer sold his product in the commercial market. Buying cheap and selling dear, he had no other standard than that of large profits: at the height of this economy John Bright defended the adulteration of goods in the British House of Commons as a necessary incident of competitive sale.

"This struggle for the market was finally given a philosophic name: it was called the struggle for existence. Wage worker competed against wage worker for bare subsistence; the unskilled competed against the skilled; women and children competed against the male heads of families. Along with this horizontal struggle between the different elements in the working class, there was a vertical struggle that rent society in two: the class struggle, the struggle between the possessors and the dispossessed."

This way of life, which was created by the impact of the machine upon the instincts of acquisitiveness, of hunger and of greed, was neither materialism as a philosophy, nor atheism as a negation of religion. Instead, it was pure Devil worship—the worship of mechanical idols which demanded more blood than was ever spilt on the altar of the Aztec war god—Huitzilopochtli. More monstrous still, it uprooted hell and transplanted it on earth; for through the mutual degradation of employer and worker it transmuted human

beings into fiends, who, on account of their physical and moral degeneration, spawned their like.

It was not that this upthrust of Satanism went unnoticed. Prophets arose and denounced it. As early as 1794 William Blake sensed it again and again in his songs, and clearly so in "London," the first verse of which reads:

> "I wander through each chartered street,
> Near where the chartered Thames does flow,
> And mark in every face I meet,
> Marks of weakness, marks of woe."

In 1830 Thomas Carlyle dramatically exclaimed:

> "Call ye that a Society . . . where there is no longer any Social idea extant; not so much as the Idea of a common Home, but only of a common overcrowded Lodging-house? Where each, isolated, regardless of his neighbours, clutches what he can get, and cries 'Mine!' and calls it Peace, because in the cut-purse and cut-throat scramble, no steel knives, but only a far cunninger sort, can be employed."

Then, twenty-four years later, Tennyson wrote

"Why do they prate of the blessings of Peace? We have made them a curse;
Pickpockets, each hand lusting for all that is not its own,
And lust of gain, in the spirit of Cain, is it better or worse
Than the heart of the citizen hissing in war on his own hearthstone?

"But these are the days of advance, the works of the men of mind,
When who but a fool would have faith in a tradesman's ware or his word?
Is it peace or war? Civil war, as I think, and that of a kind
The viler, as underhand, not openly bearing the sword."

To return to Lewis Mumford; he sums up the final outcrop of this artificial struggle for existence as follows:

> "The state of paleotechnic [coal and iron] society may be described, ideally, as one of wardom. Its typical organs, from mine to factory, from blast-furnace to slum, from slum to battlefield, were at the service of death. Competition: struggle for existence: domination and submission: extinction. With war at once the main stimulus, the underlying basis, and the direct destination of this society, the normal motives and reactions of human beings were narrowed down to the desire for

domination and to the fear of annihilation—the fear of poverty, the fear of unemployment, the fear of losing class status, the fear of starvation, the fear of mutilation and death. When war finally came, it was welcomed with open arms, for it relieved the intolerable suspense: the shock of reality, however grim, was more bearable than the constant menace of spectres, worked up and paraded forth by the journalist and the politician. The mine and the battlefield underlay all the paleotechnic activities; and the practices they stimulated led to the widespread exploitation of fear."

It may be argued that Mumford is concerned with the dismal middle years of the last century, and that conditions since then have been radically changed. This is only partially true; for though the boughs of the Capitalist Age had by the end of that century been trimmed and lopped, its roots held firm until the First World War, and still remain vital in the so-called democratic countries. As Mumford points out:

". . . war is the supreme drama of a completely mechanized society," and then adds: "for those actually engaged in combat," war "brings a release from the sordid motives of profit-making and self-seeking that govern the prevailing forms of business enterprise, including sport: the action has the significance of high drama. . . . The death or maiming of the body gives the drama the element of a tragic sacrifice, like that which underlies so many primitive religious rituals: the effort is sanctified and intensified by the scale of the holocaust. For peoples that have lost the values of culture and can no longer respond with interest or understanding to the symbols of culture, the abandonment of the whole process and the reversion to crude faiths and non-rational dogmas, is powerfully abetted by the processes of war. If no enemy really existed, it would be necessary to create him, in order to further this development.

"Thus war breaks the tedium of a mechanized society and relieves it from the pettiness and prudence of its daily efforts, by concentrating to their last degree both the mechanization of the means of production and the countering vigour of desperate vital outbursts. War sanctions the utmost exhibition of the primitive at the same time that it deifies the mechanical. In modern war, the raw primitive and the clockwork mechanical are one.

". . . as long as the machine remains an absolute, war will represent for this society the sum of its values and compensations: for war brings people back to earth, makes them face

the battle with the elements, unleashes the brute forces of their own nature, releases the normal restraint of social life, and sanctions a return to the primitive in thought and feeling. . . . War, like a neurosis, is the destructive solution of an unbearable tension and conflict between organic impulses and the code and circumstances that keep one from satisfying them.

". . . A society that has lost its life values will tend to make a religion of death and build up a cult around its worship—a religion not less grateful because it satisfies the mounting number of paranoics and sadists such as a disrupted society necessarily produces."

Such was the world the Machine created, not because Man begat it, but because he worshipped it.

Chapter II

STEAM POWER AND WAR

THE FRENCH REVOLUTION WAS AS MUCH A MILITARY AS A SOCIAL upheaval. Changes which for centuries had been in gestation suddenly sprang to life. Gunpowder, as Carlyle says, "makes all men alike tall," and during the years 1789–1796 it was this propellant which *par excellence* became the weapon of the people, Condorcet, in his *Tableau de l'Esprit Humain*, directly connecting the rise of modern infantry with the rise of democracy—it would have been more correct had he reversed this connection.

The turning-point in this vast change over from one epoch to another was the Battle of Valmy, fought on September 20, 1792. There the soldiers of France passed through their national fire baptism, the thunder of the cannon, as heard by Goethe, announcing the advent of the age in which we live. The armies of the Revolution were the apotheosis of infantry, the arm and military expressions of democracy, the arm of the nation in arms. Chaotic, undisciplined, panic-ridden, audacious and ecstatic, France, a nation of *sansculottes* led by citizen generals, defended herself against the skilled soldiers of emperors and kings. A totally new spirit was thus given to war, a spirit which found its focal point in Napoleon who, by ploughing up the decaying feudalism of Europe, prepared her for the seed of the Industrial Revolution.

Excepting for the brilliance of his strategical conceptions and his profound understanding of men, Napoleon added little to the art of war outside rendering it more mechanical by the increasing use of artillery—that is, fire power. On this question he said: "The better the infantry, the more one must husband it and support it with good batteries." . . . "Missile weapons are now become the principal ones: it is by fire and not by shock that battles are decided to-day." . . . "The power of infantry lies in its fire. In siege warfare, as in the open field, it is the gun which plays the chief part; it has effected a complete revolution . . . it is with artillery that war is made."

It was General Karl von Clausewitz who, in his philosophical survey of the Napoleonic Wars, interpreted the Master, and by doing so presented to the world the most profound work on war ever written. Dying of cholera in 1831, his unfinished *Vom Kriege* (*On War*) was published by his widow during the following year, and the nature of its leading doctrines may be gathered from these brief quotations:

First, as to the relationship between war and politics, Clausewitz laid down:

> "War is only a continuation of State policy by other means." . . . "War is not merely a political act, but also a real political instrument, a continuation of political commerce." . . . "War is only a part of political intercourse, therefore by no means an independent thing in itself." . . . "Is not war merely another kind of writing and language for political thought?" . . . "If war belongs to policy, it will naturally take its character from thence. If policy is grand and powerful, so will also be the war."

Secondly, as to the nature of war:

> "War is nothing but a duel on an extensive scale." . . . "Let us not hear of Generals who conquer without bloodshed." . . . "War is an act of violence pushed to its utmost bounds." . . . "Our aim is directed upon the destruction of the enemy's power." . . . "Destruction of the enemy's forces is in reality the object of all combats." . . . "The more is war in earnest, the more is it a venting of animosity and hostility."

This leads, thirdly, to the offensive:

> "There is only one form of war: to wit, the attack of the enemy." . . . "The combat is the single activity in war."

Which demands, fourthly, numerical superiority:

"The best strategy is always to be strong." . . . "A war should be waged with the whole weight of the national power." . . . "A people's war in civilized Europe is a phenomenon of the nineteenth century."

And, fifthly, moral and intellectual superiority:

"Courage is the highest of virtues." . . . "The chief qualities are the talents of the Commander; the military virtue of the Army; its National feeling." . . . "There is nothing in war which is of greater importance than obedience."

Sixthly, as regards tactics:

"The destructive principle of fire in the wars of the present time is plainly beyond measure the most effective." . . . "The defensive form of war is in itself stronger than the offensive . . . but has a negative object." . . . "The attack is the positive intention, the defence the negative." . . . "Only great and general battles can produce great results."

Lastly, as regards organization:

"War is divided into preparation and action." . . . "Everything is very simple in war; but the simplest thing is difficult." . . . "War belongs not to the province of arts and sciences, but to the province of social life."

In brief, such are the doctrines of Karl von Clausewitz, and when taken together they form a kind of "Spartanism," which turns the nation into a military machine instead of merely providing it with a protective servant, as was the outlook of the eighteenth century. Yet at the time his book—which in influence on mankind may be bracketed with Darwin's *Origin of Species* and Marx's *Das Kapital*—drew little attention, because in fact his central idea of "a nation in arms" was impracticable until the general adoption of the railway, which, at the time of his death, was still in its earliest infancy.

Nevertheless, during the half-century preceding that date, the stationary engine had already largely transformed manufacture, and more particularly so in England. As early as 1818, Lord Cochrane, later on tenth Earl of Dundonald, and certainly the most remarkable admiral in British history, had declared in the House of Commons:

"I will appeal to the knowledge of those members engaged in commerce, and ask them whether the acts of the legislative body have not been of a description, during the late war, that would, if not for the timely intervention of the use of machinery, have sent this nation to total ruin? The country is burthened to a degree which, but for this intervention, it would have been impossible for the people to bear."

He saw clearly that the whole of the eighteenth century had been an age of increasing industrial development, a development which must accelerate as the years advanced. Until about 1730 British manufacture had depended on foreign inventions. Ten years later smelting with coal or coke, instead of charcoal, was introduced. In 1740 the annual output of iron in Great Britain was about 17,000 tons; by 1800 it had risen to 150,000 tons, and forty years later it stood at 1,400,000 tons. In the second half of the eighteenth century, machines began to make machines—this was the true beginning of the Industrial Revolution. In 1769—the year Napoleon and Wellington were born—James Watt produced the first practical steam-engine, and in the year Napoleon was finally defeated—namely, 1815—the first steamer made its passage from London to Glasgow; and three years later the *Rising Star*, built under the direction of Lord Cochrane and his brothers, was the first steam vessel to cross the Atlantic.

Nor was land transport behindhand. In 1769, Cugnot, in France, invented a rudimentary steam carriage, and, in 1802, Trevithick produced a more serviceable one in England. Napoleon considered their military use. Meanwhile came Trevithick's first locomotive in 1801, and, in 1825, the first true railway was constructed by George Stephenson between Stockton and Darlington. Here were forces Cyclopean, though as yet one-eyed, which were about to change the face of the world, and, in the changing of it, raise war from the cockpit of a gladiatorial display to the grand amphitheatre of contending nations.

Though war, as we have seen, contributed vastly to inventions, the soldier and the sailor have seldom possessed inventive minds. Mentally, the majority are monks to whom a tactical novelty is as horrific as, proverbially, holy water is to the Devil. Steam-power meant nothing to them, they were as Marshal Saxe had found them in his day and had left them. He said:

"Gustavus Adolphus invented a method which was followed by his scholars, and carried into execution with great success; but since his time there has been a gradual decline amongst us; which must be imputed to our having blindly adopted maxims,

without any examination of the principles on which they were founded . . . from whence it appears that out present practice is nothing more than a passive compliance with received customs, the grounds of which we are absolute strangers to."

As examples of this: In 1832 the Admiralty was not interested in steamships, outside laying down a regulation that "on no account are ratings to be allowed to place their clothes in the boiler when it is under steam." Should a flue get choked, then the method advocated for cleaning it was, "to fire a musket up the funnel." In 1828, when the Colonial Office asked the Admiralty for a steamer to convey mails from Malta to the Ionian Islands, the following reply was received: "Their lordships felt it their bounden duty to discourage to the utmost of their ability the employment of steam vessels, as they considered that the introduction of steam was calculated to strike a fatal blow to the naval supremacy of the Empire."

In 1805 the Revd. Alexander John Forsyth devised the percussion system and offered it to the Army, but with no results. In 1814 copper percussion caps were first manufactured, nevertheless they were not adapted to the flintlock musket until 1842. In 1824 Captain Norton invented the cylindro-conoidal bullet, yet the British Government failed to adopt this projectile until 1851. Both these inventions—indirectly due to steam-power—eventually had a revolutionary influence on tactics. The percussion cap rendered the musket serviceable in wet weather, reducing miss-fires in each 1,000 rounds from 411 to 4.5; whereas the cylindro-conoidal bullet resulted in the rifle becoming the most deadly weapon of the nineteenth century.

This short-sightedness was not due to the sudden emergence of the machine age; for certainly in England it had been dreamt of as early as the thirteenth century. Then Roger Bacon had foreshadowed it when he wrote:

"I will now mention some of the wonderful works of art and nature in which there is nothing of magic and which magic could not perform. Instruments may be made by which the largest ships, with only one man guiding them, will be carried with greater velocity than if they were full of sailors. Chariots may be constructed that will move with incredible rapidity without the help of animals. Instruments of flying may be formed in which a man sitting at his ease and meditating on any subject may beat the air with his artificial wings after the manner of birds . . . as also machines which will enable men to walk at the bottom of seas or rivers without ships."

From then onwards, as the years passed by, except for inventions dependent upon electrical power, nearly all the most modern of war weapons were conceived. In the fifteenth century that universal genius Leonardo da Vinci designed a flying machine and constructed a parachute. Also he designed a tank—not a new idea—and in 1482 he wrote to Ludovico Sforza, saying: "I am building secure and covered chariots which are invulnerable, and when they advance with their guns into the midst of the foe, even the largest enemy masses must retreat, and behind them the infantry can follow in safety and without opposition." Further still, he designed a submarine, but suppressed that invention as he considered it to be "too Satanic to be placed in the hands of unregenerated men." It was not ideas that were lacking before the advent of the steam-engine, but solely the mechanical means to bring them to fruition. In 1787 the first iron ship appeared, and in 1796, as a toy, the helicopter. The vision of flight was throughout dominant. Samuel Johnson pictured the tactical use of the aeroplane in *Rasselas*, and a little later on, in 1791, Dr. Erasmus Darwin—grandfather of Charles Darwin—did the same in the following lines:

"Soon shall thy arm, unconquered steam, afar
Drag the slow barge, or drive the rapid car;
Or on wide-waving wings expanded bear
The flying chariot through the fields of air.
Fair crews triumphant, leaning from above,
Shall wave their flutt'ring kerchiefs as they move,
Or warrior bands alarm the gaping crowd,
And armies shrink beneath the shadowy cloud."

At length steam-power began to actualize these many dreams and so rapidly that, in 1836, the Swiss General Jomini, who had served under Napoleon, wrote as follows:

"The means of destruction are approaching perfection with frightful rapidity. The Congreve rockets, the effect and direction of which it is said the Austrians can now regulate. The shrapnel howitzers, which throw a stream of canister as far as the range of a bullet—the Perkins steam guns, which vomit forth as many balls as a battalion—will multiply the chances of destruction, as though the hecatombs of Eylau, Borodino, Leipsic and Waterloo were not sufficient to decimate the European races.

"If governments do not combine in a congress to proscribe these inventions of destruction, there will be no course left but to make the half of any army consist of cavalry with cuirasses, in order to capture with great rapidity these machines; and the infantry, even, will be obliged to resume its armour of the

Middle Ages, without which a battalion will be destroyed before engaging the enemy.

"We may then see again the famous men-at-arms all covered with armour, and horses will require the same protection."

This rapid progress in weapon-power was first put to the test in the Crimea during 1854–1855, when the Minié muzzle-loading rifle proved itself to be vastly superior to the old flintlock musket. In this war chloroform was first used and newspaper correspondents first accompanied armies. To negotiate the Balaklava mud, Boydel traction engines fitted with footed-wheels were sent out from England, and there can be little doubt that it was this engine which suggested the idea of an armoured fighting machine to James Cowen, a philanthropist of this period, for he urged Lord Palmerston to use armoured traction engines fitted with scythes. The idea was, however, dropped as it was considered to be too barbarous.

The suggestion to use lethal gas as a weapon is even a more interesting one. On May 2, 1812, Lord Cochrane placed a plan before the Government for "a new and most formidable method of attacking and destroying an enemy's fleet. . . . Such a mode of attack would be irresistible, and the effect of the power and means proposed, infallible." His idea was to gas-out the enemy's ships. Nothing came of this proposal, but forty-two years later, in July, 1854, he once again submitted his "secret plan" to Sir James Graham, First Lord of the Admiralty. His covering letter is interesting; he said: "Were it necessary—which it is not—that I should place myself in an arm-chair on the poop, with each leg on a cushion, I will undertake to subdue every insular fortification at Cronstadt within four hours from the commencement of the attack," and Sebastopol could be as easily captured, he urged, "if I am allowed to put my plans in execution." To the possible objection of inhumanity, he wrote: "No conduct that brought to a speedy termination a war which might otherwise last for years, and be attended by terrible bloodshed in numerous battles, could be called inhuman, and that the most powerful means of averting all future war would be the introduction of a method of fighting which, rendering all vigorous defence impossible, would frighten every nation from running the risk of warfare at all." Though the scheme was not tried out, Dundonald predicted that gas as a weapon "would ultimately become a recognized means of warfare."

The third of the "modern" weapons of war, the submarine, also pre-dates this period. In 1776 Bushnell invented a submersible vessel which he called *The Turtle*; in 1797 Fulton invented another,

and a scheme was even suggested to rescue Napoleon from St. Helena by an under-water boat. During the war in the Crimea Bauer, a German, built a large submarine which he called the *Diable Marin*, and offered it to Russia. This is how this strange vessel arrived:

> "In May, 1856, Bauer set out in his submarine for the harbour of the fortress [Kronstadt]; he was aided in his approach by a very thick fog. The sentry on duty on the pier was amazed to see, emerging from the fog, a curious kind of vessel, of which only a small portion was discernible, and upon it stood a figure. At once the sentry challenged the stranger, and, to his amazement, received in return the correct answer. This was altogether too much for the poor fellow, and throwing away his rifle, he ran from the ghostly visitant."

It is strange to think that here in the first conflict of the steam age were suggested three new weapons, the tank, lethal gas, and the submarine. That they were not then used is not so strange, for, so far as war is concerned, statesmen and soldiers are generally two generations behind their times.

Though in an obscure, not to say dismal way, the war in the Crimea was the turning-point from military organization as it more or less had been since the days of Gustavus Adolphus to a mechanized order, the Civil War in America, fought between the years 1861–1865, was full-bloodedly a machine war in idea. Starting as a contest between minute regular and militia forces, it ended in the clinch between extensive conscript hordes. At its opening, rifles were so hard to come by that many of the Confederates were armed with shot-guns and pikes. Yet, it was in part this deficiency and still more so the lack of military traditions which resulted in an outcrop of mechanical inventions and contrivances which still remains unparalleled.

This war was altogether a novel war, a war of rifle bullets, of trenches, of abattis, and even of wire entanglements. It was a war of astonishing modernity: of armoured trains, of land mines and torpedoes; of wooden wire-bound mortars, hand grenades, winged grenades, rockets, and many forms of booby-traps. Magazine rifles were introduced and also Requa's machine gun. Balloons were used by both sides, also lamp and flag signalling as well as the field telegraph. Explosive bullets are mentioned, also a flame projector, and in June, 1864, General Pendleton asked the Chief Ordnance Officer at Richmond whether he could supply him with "stink-shell" which would give off "offensive gases" and cause "suffocating effect." Nor did modernity halt here, for in sea warfare a complete

revolution was established by the ironclads *Merrimac* and *Monitor* in one day—March 9, 1862—which rendered obsolete the wooden navies of the entire world. In England, Admiral Sir John Hay said: "The man who goes into action in a wooden ship is a fool, and the man who sends him there is a villain." A submarine was built by Horace L. Huntly at Mobile—twenty feet long, five deep and three and a half wide—which was "propelled by a screw worked from inside by seven or eight men." On February 17, 1864, she sank U.S.S. *Housatonic* off Charleston and went down with her.

This war was possessed of another aspect of modernity—namely, its brutality, and in this respect the Federal General William Tecumseh Sherman was its most skilful exponent.

Nothing like his marches and maraudings in Georgia and the Carolinas had been experienced in western warfare since the days of Tilly and Wallenstein during the Thirty Years War, and it was something utterly novel from the point of view of the eighteenth century, though during the Napoleonic Wars outcrops of it are to be found. With some justice President Jefferson Davis called Sherman the "Attilla of the American Continent."

Terror was the basic factor in his policy; he openly said so, and here are two quotations out of many:

> "Until we can repopulate Georgia, it is useless to occupy it; but the utter destruction of its roads, houses and people will cripple their military resources. . . . I can make the march, and make Georgia howl."
>
> "We are not only fighting hostile armies, but a hostile people, and must make old and young, rich and poor, feel the hard hand of war . . . the truth is the whole army is burning with an insatiable desire to wreak vengeance upon South Carolina. I almost tremble for her fate. . . ."

In Georgia Sherman estimated the damage done at $100,000,000, of which alone $20,000,000 "inured to our advantage," the remainder being "simple waste and destruction."

John Codman Ropes, one of the many historians of this war, points out that "Military operations are not carried on for the purpose of inflicting punishment for political offences," and, therefore, "if Sherman purposely destroyed, or connived in the destruction of property, which was not needed for the supply of his army or of the enemy's army, he violated one of the fundamental canons of modern warfare. . . ."

Ropes was still thinking in terms of the eighteenth century: Sherman was a typical representative of the nineteenth—the Power Age. To him and his like the following articles of war, promulgated

by Henry V of England during the Hundred Years War, would have appeared ridiculous :

> "That no manner of man be so hardy as to go into any chamber or lodging where any women lieth in childbed, in order to rob her, or pillage any goods belonging to her refreshing, nor make any affray whereby she or her child be in any disease or danger, upon pain that he who in such wise offendeth lose his goods.
>
> "That no manner of man be so hardy to take from no man going to the plough and harrow, cart, horse, nor ox, nor none other beast belonging to labour without payment and agreement.
>
> "That no manner of man beat down housing to burn, nor no apple trees, pear trees, nuts, nor no trees bearing fruit."

I wonder what Sherman would have thought of the following incident which occurred during his lifetime. In 1832 Marshal Gerard and 60,000 French troops marched on Antwerp, the citadel of which was held by the Dutch under General Chassé. In order to spare the citizens the horrors of war, Chassé agreed to direct the fire of his guns solely on the open plains if Gerard would agree to approach in no other direction. This plan was decided upon. "Rarely, if ever, was a siege conducted with so much chivalry and courtesy. . . . The stipulations regarding the neutrality of the city and the restrictions of the line of fire of both parties are noteworthy, and so well were they carried out that not a single noncombatant beyond the lines was harmed in person or property."

The imaginative age of military inventions may be said almost to have ended with the American Civil War, or rather to have been shouldered aside by the mass theory of warfare which kept pace with railway construction. Then Clausewitz's dream of a nation in arms became a reality. Simultaneously, existing weapons were vastly improved. The smooth-bore muzzle-loading cannon was succeeded by the breech-loading rifled gun, and the muzzle-loading rifle by the breech loader ; and eventually by the small-bore magazine rifle firing smokeless powder. Machine guns also began to take many forms.

In the Franco-Italian war of 1859 the railway first began to play an important part. Next, in 1866, in Prussia's Seven Weeks War against Austria, General von Moltke largely based his strategy on the iron rail, and still more so in the Franco-Prussian War of 1870–1871, when the railway rose to such importance that strategy began to be subordinated to administration and supply.

This war was followed by the rapid industrialization of Germany,

and the most stupendous colonial exploitation, which between 1875 and the end of the century added over 10,000,000 square miles of territory to Great Britain, Germany, France, and Belgium. In turn these events led to increasing international friction, which between Germany and Great Britain was brought to a turning-point when, in 1898, Kaiser William II proclaiming that Germany's future lay on the water, set out to build a great navy.

As the century closed, a new outcrop of inventions was seen, the four more important being the marine turbine engine—the oldest of steam-power ideas—the perfection of the submarine, the transmission of messages by wireless waves and the perfecting of the internal combustion engine.

As regards the first two, they were destined to revolutionize naval warfare, whereas the last two introduced a totally new dispensation of war, transcending anything as yet accomplished by either gunpowder or steam-power; yet little suspected at the time. In 1897 Marconi succeeded in sending a message over a distance of nine miles, and in 1901 over three thousand. In 1900 Great Britain ordered five submarines to be built, and in 1906 Germany launched one at Kiel—the U.1. In 1900 the "Thousand Miles Motor Trial" was held, and Henri Beconnais, "the king of chauffeurs, set up a remarkable world's record" by "riding at an average of over forty-seven miles an hour." This progress in movement which was destined gradually to leaven the mass theory of war, rapidly led to the solution of the age-old problem of flight. On December 17, 1903, near Kill Devil Hill, Kitty Hawk, N. Carolina, Orville Wright, in a power-driven aeroplane, flew for twelve seconds, and six years later Blériot spanned the English Channel.

The military play-board was now set for a game of unknown dimensions.

Chapter III

THE FIRST WORLD WAR

TACTICALLY, THE WAR OF 1914–1918 WAS A BLIND EVOLUTION FROM mass to machine fighting, for whereas mass by multiplying numbers begets defensive power, machines by enhancing mobility beget offensive power. Though these statements are truisms, between the years 1875–1913 they were certainly not looked upon as such, for during that period the greater Powers went on piling up rifles

and cannon and yet training their soldiers for an *offensive à outrance.* Though that idea was in itself sound enough, for as Frederick the Great once said: "To conquer is to advance," the means to achieve it were non-existent. Had these Powers realized this, instead of multiplying men they would have turned to the petrol engine, which, as we shall see, was the key to the whole problem. Nor can they plead that they were not warned what mass warfare would lead to, for immediately before the petrol age made its public appearance, a Polish Jew banker, Monsieur I. S. Bloch, analysed the question in an elaborate book entitled *The War of the Future in its Technical, Economic and Political Relations*, an abridged edition appearing in English in 1899 under the title *Is War Now Impossible?*

Agreeing with Clausewitz that war is a political instrument, the secret of his prevision lay in that, as society had changed during the preceding half-century, passing from the agricultural phase into the industrial, he saw that the form of war must change also. He said: "What is the use of talking about the past when you are dealing with an altogether new set of considerations? Consider for one moment what nations were a hundred years ago and what they are to-day. In those days before railways, telegraphs, steamships, etc., were invented, each nation was more or less a homogeneous, self-contained, self-sufficing unit. . . . All this is changed. . . . Every year the interdependence of nations upon each other for the necessaries of life is greater than it ever was before. . . . Hence the first thing that war would do would be to deprive the Powers that made it of all opportunity of benefiting by the products of the nations against whom they were fighting." And again: "The soldier is going down and the economist is going up. There is no doubt of it. Humanity has progressed beyond the stage in which war can any longer be regarded as a possible [?profitable] Court of Appeal?" Therefore war between the great industrial Powers is nothing more than mutual suicide. The old conception of war as a business is absurd; to-day it is a mad kind of burglary—the plundering of a part of one's own house!

His forecast of what the next war would be like reads as follows:

> "At first there will be increased slaughter—increased slaughter on so terrible a scale as to render it impossible to get troops to push the battle to a decisive issue. They will try to, thinking that they are fighting under the old conditions, and they will learn such a lesson that they will abandon the attempt for ever. Then, instead of a war fought out to the bitter end in a series of decisive battles, we shall have as a substitute a long period of continually increasing strain upon the resources of the combatants. The war, instead of being a hand-to-hand contest

in which the combatants measure their physical and moral superiority, will become a kind of stalemate, in which neither army being able to get at the other, both armies will be maintained in opposition to each other, threatening each other, but never being able to deliver a final and decisive attack. . . . That is the future of war—not fighting, but famine, not the slaying of men, but the bankruptcy of nations and the break-up of the whole social organization. . . . Everybody will be entrenched in the next war. It will be a great war of entrenchments. The spade will be as indispensable to a soldier as his rifle. . . . All wars will of necessity partake of the character of siege operations . . . soldiers may fight as they please; the ultimate decision is in the hand of *famine*. . . . Unless you have a supreme navy, it is not worth while having one at all, and a navy that is not supreme is only a hostage in the hands of the Power whose fleet is supreme."

Though this is an exact picture of what actually took place, soldiers of all nations and more particularly those of France saw the next war otherwise. In his *A Critical Study of German Tactics*, de Pardieu writes:

"In a war between France and Germany we do not anticipate a battle of such a nature [*i.e.*, an entrenched battle]. The fortified places are already quite numerous, and an army that would shut itself up in a permanent defensive position would be inviting destruction.

"The defence will always be only temporary, and consequently will be made in a position hastily established, which the enemy will have to take quickly, otherwise the motives which imposed a temporary defence will have soon ceased and the force on the defensive will pass to the offensive.

"Battles in entrenched camps as occurred at Plevna or Mukden will never take place in a war with the French armies."

Here is another French forecast:

"The war will be short and one of rapid movements, where manœuvre will play the predominant part; it will be a war of movement. The battle will be primarily a struggle between two infantries, when victory will rest with the large battalions; the army must be an army of personnel and not of *matériel*. The artillery will only be an accessory arm, and with only one task—to support the infantry attack. For this task it will only require a limited range, and its first quality must be its

rapidity of fire, to admit of it engaging the manifold transitory targets which the infantry will disclose to it. The obstacles which one will meet in the war of movement will be of little importance; field artillery will have sufficient power to attack them. In order to follow as closely as possible the infantry to be supported, the equipment must be light, handy, and easy to manœuvre. The necessity for heavy artillery will seldom make itself felt, at all events, it will be wise to have a few such batteries, but these batteries must remain relatively light in order to retain sufficient mobility, which precludes the employment of heavy calibres and powerful equipments. A battery of four 75 mm. guns develops absolute efficiency on a front of 200 metres; it is consequently unnecessary to superimpose the fire of several batteries. . . ."

It would have been difficult to concoct, even as a joke, a more faulty appreciation.

What was the result when the next war became a fact? After a few weeks of *real* warfare, the *offensive à outrance,* that high gospel of the pre-war manuals, was reduced to a wallowing defensive among mud holes and barbed wire. Armies, through their own lack of foresight, were reduced to the position of human cattle. They browsed behind their fences and on occasion snorted and bellowed at each other. The one problem which now confronted them was: how to re-establish movement, because until one or both sides could move, there was no possibility of a decision by arms, and famine alone must become the arbiter of victory. Some there were who actually recommended this course, but their voices were drowned by shouts for shells. Shells were to be the panacea of all difficulties: more shells and still more shells, and then by a hurricane of steel a road was to be blasted to Paris or Berlin. A veritable blood and iron lust swept over the armies of Europe.

There were two obvious reasons why this monstrous attack by shells was doomed to fail. First, it destroyed all forward communications; roads vanished, tracks vanished, railways vanished, and the surface of the ground vanished under the influence of the material earthquake to which all things were subjected. Secondly, bombardments lasting from seven to twenty-one days in duration rendered any form of surprise impossible. When a big-game hunter visits Africa to shoot lions, he does not equip himself with a bassoon, and then, when a lion is met with, walk round the beast for a fortnight playing on that instrument. He does not thus comport himself because all idea of surprise would vanish, and so also would the lion. Unfortunately, a staunch and determined enemy does not behave himself like a wild animal; instead of bolting from the

bassoon, he assembles his forces opposite the spot which, like Jericho, is being trumpeted to earth, and when the attacker is well bogged in the slough created by his own gun-fire, he attacks in turn.

Nevertheless, it is interesting to note that these futile attacks would have been impossible but for the petrol engine. For example, at the Third Battle of Ypres, fought in 1917, the preliminary bombardment alone consumed 4,283,550 shells, costing £22,000,000 and weighing 107,000 tons. To transport this amount from railhead to battlefield demanded 35,666 lorry loads. Therefore, had the lorry not been invented, these battles could not have been fought.

When this problem of how to reinstate movement is examined logically instead of traditionally, it will be seen that its solution is to be sought not in demolishing trenches, but instead: (1) by ignoring them; (2) by killing their garrisons, and (3) by making trenches walk. The first could be effected by the aeroplane, the second by lethal gas, and eventually the third was answered by the tank.

The first of these weapons was not as yet sufficiently advanced to carry large numbers of soldiers over the enemy trenches and deposit them in rear of them, and the second, though successfully used by the Germans during an attack in the Ypres area in the spring of 1915, was soon countered by the gas helmet and then more completely by the box respirator. The third was the sole one which offered undoubted possibilities and the tank first went into action on the battlefield of the Somme on September 15, 1916. Thence onwards until the Battle of Cambrai, fought between November 20 and December 1, 1917, it was grossly mishandled by the British High Command, nevertheless during that battle—the true origin of the so-called "lightning attack"—it established a tactical revolution.

As a mobile fortress in which are combined the protective advantages of siege warfare and the offensive powers of field, between 1916 and 1918 the tank revolutionized the art of war as understood since the abandonment of body armour. Hitherto the two great difficulties in minor tactics had been: how to harmonize movement and fire and movement and protection. What the tank accomplished was this:

(1) It increased mobility by substituting mechanical power for muscular.

(2) It increased security by neutralizing the bullet by carrying armour plate.

(3) It increased offensive power by relieving the soldier from the necessity of carrying his weapons, and the horse from hauling them. Also it increased the destructive powers of the weapons carried by increasing their ammunition supply.

In other words—it enabled an army to obtain a greater effect from its weapons in a given time with less loss to itself than one relying for motor force on muscular energy. While it secured a man dynamically, it enabled him to fight statically. Therefore it superimposed naval tactics on land tactics—that is, it enabled men to discharge their weapons from a moving platform protected by a fixed shield.

During this war every carefully organized tank battle was not only a success, but an overwhelming one, and in connection with this the following calculations are of interest:

In the five months July to November, 1916, the British Army lost approximately 475,000 men, captured 30,000 prisoners and occupied some 90 square miles of enemy territory. During the same months in 1917, its losses were 370,000, the prisoners captured 25,000, and the ground occupied 45 square miles. In those same months in 1918, its losses were 345,000, the prisoners captured 176,000 and the ground occupied was 4,000 square miles. If now losses are divided by square miles, an estimate of casualties per square mile gained will be obtained. These figures are approximately as follows:

(1) July to November, 1916: 475,000 ÷ 90 sq. miles = 5,277 casualties per sq. mile.

(2) July to November, 1917: 370,000 ÷ 45 sq. miles = 8,222 casualties per sq. mile.

(3) July to November, 1918: 345,000 ÷ 4,000 sq. miles = 86 casualties per sq. mile.

In the third period alone were tanks used efficiently.

Great though the revolution created by the tank was, still greater was the revolution established by the aeroplane, because it raised warfare from a two- to a three-dimensional art. As I shall be entering more fully into this revolution in Part II, here I will alone examine the influence of this machine on tank tactics during the latter part of the war.

On account of tank losses by enemy field-gun fire in the attack on the Flesquières ridge during the Battle of Cambrai, in February, 1918, trials between advancing tanks and low-flying aeroplanes were carried out at Fricourt, and proved so successful that in the following July, the 8th Squadron, R.A.F., equipped with 18 Armstrong-Whitworth machines, was attached to the Tank Corps and co-operated with it throughout the rest of the war. Its main duties were to provide:

(1) Contact patrols to keep tank battalion and company headquarters informed of the progress of their machines and of the enemy's movements and dispositions.

(2) Attack patrols to locate the enemy's anti-tank defences, artillery, etc., and not only attack them, but also signal their positions by means of smoke bombs.

(3) An escort of fighters to protect these low-altitude operations.

Though in the British Army this co-operation ceased with the ending of the war, as we shall see later on, it was developed by the Germans, and out of it emerged their Stuka (dive-bombing) tactics.

So successful were the British and French tanks during 1918, that for 1919 a totally new conception of attack was projected by myself and accepted by Marshal Foch. It is worth quoting here, because it shows what was contemplated had the war continued into 1919.

In condensed form this project reads as follows :

The possibility of maintaining supply and of moving weapons irrespective of roads introduces an entirely new problem. At the moment, he who grasps the full meaning of this change—namely, that the earth has now become as easily traversable as the sea, multiplies his chances of victory to an almost unlimited extent. To-day, to pit an overland mechanically moving army against one relying on roads, rails, and muscular energy, is to pit a fleet of modern battleships against one of wind-driven three-deckers.

Nevertheless, up to the present the theory of the tactical employment of tanks has been based on trying to harmonize their powers with existing methods of fighting. In fact, the tank idea, which carries with it a revolution in the method of waging war, has been grafted on to a system it is destined to destroy, instead of being given free scope to develop on its own lines.

Irrespective of the arm employed, the object of battle is to destroy the enemy's fighting strength. As this strength lies in the organization of his army, consequently, if that organization is disrupted, its fighting strength will be destroyed. There are two ways of accomplishing this :

(1) Either by wearing it down (dissipating it).
(2) Or by rendering it inoperative (unhinging it).

In war the first consists in the killing, wounding, capturing and disarming the enemy's soldiers—body warfare. The second in the paralysation of his command—brain warfare. Take a single man as an example : the first method may be compared to a succession of slight wounds which will eventually cause him to bleed to death ; the second—a shot through the head.

The brains of an army are its Staff—Army, Corps and Divisional headquarters. Could we suddenly remove these from an

extensive sector of the German front, the collapse of the personnel they control would be a matter of hours, even if only slight pressure were exerted. Even were no pressure brought to bear, but instead should the shot through the enemy's head be followed by one through his stomach—that is, if we dislocated the enemy's supply system behind his protective front—his men will starve to death or scatter.

What are the requirements needed in order to render inoperative the Command of the German forces on any given front?

From the German front line the average distance away of nine of their Army Headquarters is eighteen miles; of three Army Group Headquarters—forty-five miles, and of their Western G.H.Q. one hundred miles.

Before reaching these headquarters elaborate systems of trenches and wire entanglements, protected by every known type of missile-throwing weapon, have to be crossed.

To penetrate or avoid this belt of resistance—which may be compared to a shield protecting the system of command—two weapons suggest themselves:

(1) The aeroplane.
(2) The tank.

The difficulties in using the first are considerable; for even if landing grounds can be found close to the various headquarters, once the men are landed, they are no better armed than the men they will encounter. In fact, they may be compared to dismounted cavalry facing infantry.

The difficulties of the second are merely relative, because at present we do not possess a tank capable of carrying out the work satisfactorily; nevertheless, one is now being built—namely, the Medium D. tank, which will move at a speed of 20 miles an hour and possess a circuit of action of 150 to 200 miles.

The tactics of this machine are based on the principles of movement and surprise. Its object is to accentuate surprise by movement, not so much by speed itself as by creating a series of unexpected situations. We must never do what the enemy expects; instead he must be misled—that is, his brain must be controlled by our own. The probability of certain actions must be suggested to him, and then, when action is demanded, it must be developed in a way diametrically opposite to the one our preparations have led him to expect.

Thus, in the past, when we massed men and guns opposite a given sector, he did the same and frustrated our attack by making his own defences so strong that we could not break through them, or if we did, were too exhausted to exploit our success.

A study of Napoleon's tactics will show us that the first step he took in battle was not to break his enemy's front, and then, when his own forces were disorganized, risk being hit by the enemy's reserves. Instead, his aim was to draw the enemy's reserves into the fire fight, and, once they were drawn in, either to hold and envelop them, or break through them. This done, the enemy was compelled to retire, when a pursuit became possible.

What we now should aim at is a combination of the following ideas :

(1) To force the enemy to mass his reserves in a given sector.
(2) To disorganize these reserves *before* we break through them.

This done, pursuit—the tactical act of annihilation—can take place. Pursuit is the dividend of victory ; therefore the more reserves we force the enemy to mass, so long as we disorganize them, the greater will be the tactical interest on our capital. With the Medium D. tank working in co-operation with the aeroplane there is no reason why we should not receive 100 per cent interest upon our investments. This represents winning the war in a single battle.

Such a battle may, in brief, be outlined as follows :

A frontage of attack of about one hundred miles in width should be selected, and on it by the inducement of visible preparations some four or five German armies collected. Then the area between the line connecting up German Army Headquarters and the line linking up their Divisional Headquarters will form the zone of the primary tactical objective. Heretofore it has been the area between the enemy's front line and his main gun positions, but this area will now become the secondary tactical objective. The geographical position of objectives is, therefore, reversed : the last becomes the first and the first becomes the last. Herein exists the foundation of surprise.

Once preparations are well in hand, without any warning, fleets of Medium D. tanks should proceed at top speed by day, or possibly by night, directly on to the various Headquarters situated in the primary tactical zone. If by day, these targets can be marked by aeroplanes dropping coloured smoke, and if by night, by dropping coloured lights, or by guns firing coloured light shells. As the longest distance to be covered may be taken as twenty miles, the Medium D. tanks should reach the German Army Headquarters in about two hours.

Meanwhile every available bombing machine should concentrate on the various supply and road centres. The signal communica-

tions should not be destroyed, for it is important that confusion should be circulated by the enemy. Bad news confuses, confusion stimulates panic.

So soon as orders and counter-orders have been given a little time to establish confusion, a methodically mounted infantry, tank and artillery attack should be launched, the objective of which is the zone of the enemy's guns—that is, the secondary tactical objective, some 10,000 yards in depth.

Directly penetration has been effected, pursuit should follow, the pursuing force consisting of all the Medium tanks available and lorry-carried infantry. To render this force doubly powerful, it should be preceded by squadrons of Medium D. machines, which will secure all centres of communication, break up enemy Army Group Headquarters and disperse all formed bodies of troops met with. The German Western G.H.Q. should be dealt with by dropping several hundred tons of explosives upon it.

In this battle of surprise and disorganization through demoralization, I considered that the duties of the R.A.F. should be as follows:

(1) To act as an advanced guard to the tanks.
(2) To assist tanks in disorganizing the enemy's headquarters.
(3) To guide tanks on to their objectives.
(4) To protect tanks from hostile gun fire.
(5) To supply advanced squadrons of tanks with petrol, etc.
(6) To act as messengers between tanks and their bases.
(7) To carry forward tank Brigade Commanders.

Lastly, the following remarks were made:

> "Strategy, or the science of making the most of time for warlike ends, that is of opportunity, will practically cease for that side which pits muscular endurance against mechanical energy.
>
> "The possibility of applying naval tactics to land warfare is an entirely new application of the strategical principles which at present endows the side which can apply them with incalculable power. . . ."

This project—quoted in full in my *Memoirs* under the title "Plan 1919"—was written on May 24, 1918. Strange to say, though, on account of the armistice of November 11 it was never put into operation against the Germans, twenty years later in modified form it was they who tested it out in Poland, and then during 1940 by means of it conquered France in five weeks.

Chapter IV

TOTAL WAR

THE PREDOMINANT CHARACTERISTIC OF THE FIRST WORLD WAR WAS its universal grip on all national activities. Not only was the seat of war extended to include all belligerent territories, but the supplies required to maintain operations active demanded the exploitation or co-operation of every industry. For instance, Francis Delaisi writes: "Cellulose can produce both artificial silk and smokeless papers or powders. With glycerine we can make both soap and dynamite; with chlorine the household Javel water, the terrible phosgene and vomiting gas; and with brome, photographic plates or tear-gas at will." This not only made it impossible to distinguish where the sphere of the fighting forces began and that of the civil population ended; but the enormous influx of civil workers into the munition factories led to war not only as heretofore—that is, waged directly against the enemy's armed forces—but indirectly against his civil population as well.

In short, the whole of each belligerent nation was merged into the conflict, for it was impossible to distinguish who was the more important—the worker or the fighter. For example, in France, between 1914 and 1917, the production of 75 mm. shells rose from 13,000 to 225,000 a day and absorbed 900,000 workers. And, at the close of the war, the French armies in the field, numbering some 3,000,000 men, depended on the work of over 2,000,000 workers, 400,000 of whom were women. War, in fact, had become one vast national business in which every activity of the nation was regimented.

The four fundamental lessons emerging out of this great conflict were that the business of industrialized war demanded the increasing necessity for (1) political authority; (2) economic self-sufficiency; (3) national discipline, and (4) machine weapons. Further still, as war and peace are inseparable—for war emerges out of peace and peace out of war—both the winning and losing of the war clearly showed that these lessons must be applied during peace time in order to be ready for war.

As is not uncommon in history, those nations which had suffered most turned towards what the war could teach them, whereas those who had suffered least did not even trouble to examine it; rather did they thrust it aside in order to clear the way for their illusive scramble back to before-war conditions.

Of the three greater Powers—namely, Russia, Italy and Germany

—who set out to build upon the above four lessons, Russia and Germany alone took the fourth to heart. Yet, whereas the Russians fashioned their fighting forces round the machine as the principal element, the Germans created theirs from out of the human qualities of the man who controls it. For the one system to work, the machine had to be rendered as fool proof as possible and produced in vast numbers in order to cancel out human ignorance in its use; for the other, it had to accentuate the fighting powers of man himself and simplify them. Thus the Russian army continued to be governed by the quantity idea, whereas the German, irrespective of its eventual size, turned towards the idea of quality.

This military revolution, upon which so much was to turn, was literally forced upon Germany at the points of British and French bayonets; because, in accordance with the terms of the Versailles Peace Treaty, her vast quantity army was reduced to 100,000 men, who as soldiers were useless unless quality of fighting power could in part at least make good the stupendous loss in numbers. Further still, as this small force was forbidden to possess the more modern machine weapons—tanks and aeroplanes—a tremendous stimulus was given to the study of them. In other words, the short-sightedness of the Allied Powers automatically created in the Reichswehr a hunger for the novel and the new. The outcome of this colossal folly was that, while the maintenance in France and Great Britain of obsolete and obsolescent equipment carried with it the maintenance of obsolete and obsolescent ideas, directly Germany was in a position to revert to the mass production of weapons, a new equipment was planned in accordance with new ideas, and the initial one was that of General von Seeckt—the first Commander-in-Chief of the reduced Reichswehr—namely:

> "Material has prevailed over human masses but not over *man* and never will, because it only becomes animate in the hand of man.
>
> "The mistake lies in opposing an immobile and almost defenceless human mass to the brutal action of material. The more we increase the mass of combatants, the more certain is the triumph of material, for its capacity is far wider than that of the richest reservoir of men. The only possibility lies in the struggle of the human mind against lifeless material. . . . Material is superior to the living, mortal human mass, but it is not superior to the living and immortal human mind." (*Thoughts of a Soldier.*)

General von Ludendorff, then the most noted military figure

in Germany, held a similar view, for he said: ". . . in the last resort it was always man who had to serve the technical machinery. Both of them, machines and men, or rather men and machines, determine the strength of an army. Yet man will always take first place."

Both these soldiers were wittingly or unwittingly disciples of Thomas Carlyle, for nearly a hundred years before their day he had written in his *Sartor Resartus*:

> "Such I hold to be the genuine use of Gunpowder: that it makes all men alike tall. Nay, if thou be cooler, cleverer than I, if thou have more *Mind*, though all but no *Body*, whatever, then canst thou kill me first, and art the taller. Hereby, at last, is the Goliath powerless, and the David resistless; savage Animalism is nothing, inventive Spiritualism is all."

The high prophet of this "inventive Spiritualism "was Adolf Hitler, who, following Ludendorff, took Clausewitz and inverted him, as in his day Karl Marx had inverted Hegel, who was also Clausewitz's spiritual father. Instead of war being considered the instrument of politics, politics was now looked upon as the instrument of war; because, as the argument ran, both war and politics are subservient to the people's instinct for self-preservation; therefore it follows that war is the supreme expression of the people's will to live.

Here we listen to an echo from Nietzsche:

> "Ye shall love peace as a means for new wars, and a short peace better than a long one.
>
> "I do not counsel you work but conflict. I do not counsel you peace but victory. Let your work be a conflict, your peace a victory."

Farther away still—to Herakleitos:

> "Men should know that war is general and justice is strife; all things arise and pass away through strife.
>
> "The name of the bow is life, but its work is death."

Yet in justice to Ludendorff, Hitler and others, though this war philosophy was in no way new in Germany, the Allied Powers did nothing to allay it and much to stimulate it. In the circumstances in which Germans had been placed by the Peace Treaty, either they had to abandon their position as a great nation or fight.

Hitler's philosophy of war is so important to the understanding

of the present struggle—the Second of the Machine Wars—that I will now turn to it, quoting from Hermann Rauschning's *Hitler Speaks*; for though that writer is a hostile witness, his picture of Hitler as General, or rather as War Prophet, shows him to be one of the most original soldiers in all history.

The key to his philosophy is given in a quoted conversation on pages 15–21 of the above book. Having been asked whether, during 1914–1918, it was not the Allied superiority in armaments that had brought Germany to ruin, he replied:

"It is not arms that decide, but the men behind them—always." Next he went on to explain that technical inventions do not change strategy. . . . " 'Has anything changed since the battle of Cannæ? Did the invention of gunpowder in the Middle Ages change the laws of strategy? I am sceptical as to the value of technical inventions. No technical novelty has ever permanently revolutionised warfare. Each technical advance is followed by another which cancels out its effects. Certainly the technique of warfare advances, and it will create many more novelties until the maximum of destruction is reached. But all this can only produce a temporary superiority.' "

" 'I,' he went on, 'have the gift of reducing all problems to their simplest foundations. War has been erected into a secret science and surrounded with momentous solemnity. But war is the most natural, the most everyday matter. War is eternal, war is universal. There is no beginning and there is no peace. War is life. Any struggle is war. War is the origin of all things. Let us go back to primitive life, the life of the savages. What is war but cunning, deception, delusion, attack and surprise? People have killed only when they could not achieve their aim in other ways. Merchants, robbers, warriors—at one time, all these were one. There is a broadened strategy, a war with intellectual weapons. What is the object of war, Forster? To make the enemy capitulate. If he does, I have the prospect of wiping him out. Why should I demoralize him by military means if I can do so better and more cheaply in other ways'?"

. . . . .

" 'When I wage war, Forster,' he declared, 'in the midst of peace, troops will suddenly appear, let us say, in Paris. They will wear French uniforms. They will march through the streets in broad daylight. No one will stop them. Everything has been thought out, prepared to the last detail. They will march to the headquarters of the General Staff. They will

occupy the ministries, the Chamber of Deputies. Within a few minutes, France, Poland, Austria, Czechoslovakia, will be robbed of their leading men. An army without a general staff. All political leaders out of the way! The confusion will be beyond belief. But I shall long have had relations with the men who will form a new government—a government to suit me.' "

. . . . .

" 'Peace will be negotiated before the war has begun. I promise you, gentlemen, that the impossible is always successful. The most unlikely thing is the surest. We shall have enough volunteers, men like our S.A., trustworthy and ready for any sacrifice. We shall send them across the border in peace-time. Gradually. No one shall see in them anything but peaceful travellers. To-day you don't believe me, gentlemen. But I will accomplish it, move by move. . . . Our strategy, Forster, is to destroy the enemy from within, to conquer him through himself.' "

. . . . .

" 'The place of artillery preparation for frontal attack by the infantry in trench warfare will in future be taken by revolutionary propaganda, to break down the enemy psychologically before the armies begin to function at all.' "

. . . . .

" 'How to achieve the moral break-down of the enemy before the war has started—that is the problem that interests me. . . . We shall have friends who will help us in all the enemy countries. We shall know how to obtain such friends. Mental confusion, contradiction of feeling, indecisiveness, panic: these are our weapons. . . . The lessons of revolution, these are the secret of the new strategy. I have learnt from the Bolsheviks. I do not hesitate to say so. One always learns most from one's enemies.' "

. . . . .

" 'When the enemy is demoralized from within, when he stands on the brink of revolution, when social unrest threatens—that is the right moment. A single blow must destroy him. Aerial attacks, stupendous in their mass effect, surprise, terror, sabotage, assassination from within, the murder of leading men, overwhelming attacks on all weak points in the enemy's defences, sudden attacks, all in the same second, without

regard for reserves or losses: that is the war of the future. A gigantic, all-destroying blow. I do not consider consequences; I think only of this one thing.' "

. . . . .

" 'I do not play at war. I shall not allow myself to be ordered about by 'commanders-in-chief.' *I* shall make war. *I* shall determine the correct moment for attack. There is only one most favourable moment. I shall await it—with iron determination. I shall not miss it. I shall bend all my energies towards bringing it about. That is my mission. If I succeed in that, then I have the right to send youth to its death. I shall have saved as many lives then as could be saved. Gentlemen, let us not play at being heroes, but let us destroy the enemy. Generals, in spite of the lessons of the war, want to behave like chivalrous knights. They think war should be waged like the tourney of the Middle Ages. I have no use for knights. I need revolution. I have made the doctrines of revolution the basis of my policy.' "

. . . . .

" 'I shall shrink from nothing. No so-called international law, no agreements will prevent me from making use of any advantage that offers. The next war will be unbelievably, bloody and grim. But the most inhuman war, one which makes no distinction between military and civilian combatants, will at the same time be the kindest, because it will be the shortest. And together with the fullest use of our arms, we shall grind down our enemy with a war of nerves. We shall provide a revolution in France as certainly as we shall *not* have one in Germany. Take my word for it. The French will hail me as their deliverer. The little man of the middle class will acclaim us as the bearers of a just social order and eternal peace. None of these people any longer want war and greatness. But *I* want war. To me all means are right. My motto is not: 'Don't, whatever you do, annoy the enemy!' My motto is: 'Destroy him by all and any means.' *I* am the one who will wage the war!' "

Possibly this conversation has been somewhat embellished in transcription; yet, even so, this apocalyptic vision of war, dating from so long ago as 1932, is as amoral as the age created by the Peace Treaties, and, therefore profoundly real. Few men have possessed so anabolic a mind as Hitler, for it absorbed everything which would and could further his purpose.

Though his central strategical doctrine is the moral attack, no man more clearly saw and realized that in this Machine Age the physical clash of war would be won by mobility. Not so much in order to destroy the lives of his enemy's soldiers, as to annihilate the will of their commanders by a series of stunning blows. Such operations would not only reduce casualties, but increase the number of prisoners, and so provide their captors with an ever-increasing supply of labour. Hitler's physical outlook on war was therefore that of a slave hunt. It was eminently common sense and incidentally humane.

Mobility led him full-heartedly to accept the theory of the Blitzkrieg or Lightning War, the moral effect of which was to be accentuated by undeclared attack, as I foresaw so long ago as 1922, when I wrote: "I predict that, when nations comprehend the purpose of war, wars will not be declared."

According to Albert Müller—see his *Germany's War Machine*—in 1935 Hitler spoke these words:

> "If I were going to attack an opponent, I should act quite differently from Mussolini. I should not negotiate for months beforehand and make lengthy preparatons, but—as I have always done throughout my life—I should suddenly, like a flash of lightning in the night, hurl myself upon the enemy."

This idea was in no way original, for it was Seeckt who invented the term "lightning war"; though in actual fact it was certainly as old as the fourteenth century, when, because of his rapid attacks, the Sultan Bayazid was known as "Yilderim" the "Thunderbolt."

One of the leading exponents of this method of war was Colonel Heinz Guderian, and another, Lieut.-General von Metzsch, who in 1932 wrote an essay entitled *The New Tendencies of Development in War*, in which he said:

> "Thus it is not masses of men carrying small-arms, but armies equipped for the fight with motorized long-range weapons, that can threaten a war of attack. Thus the military character of future wars will be as aggressive as possible. Thus the technical evolution of the army, based in every respect upon the motor, can only tend constantly to increase offensive strength."

Further, he realized the vast importance of the industrial base to armies which aimed at mobility. That a state without industries was never armed, and that no predominantly agricultural state could even possess an army unless it were helped by an industrial power. "Who has the petrol has the Empire," once

remarked the late Lord Curzon, and "Without a national carburant there is no national independence," said General Denvignes. These things were fully appreciated in Germany. Thus it came about that the rapid rearmament that was set on foot immediately after Hitler gained power in 1933, was rendered possible by the high technique of German industry. Her machines begot the war machine.

Chapter V

THE GERMAN ARMY

WHEN HERR HITLER FINALLY GAINED POWER IN MARCH, 1933, HE found the Reichswehr in a state of such high efficiency that he had at his immediate disposal not only a General Staff which for over ten years had been living with one thought—the next war, but also a vast number of potential regimental officers and non-commissioned officers, for practically every soldier in the Reichswehr was either one or the other. Also he had at his disposal some 2,000,000 —possibly more—semi-trained men in the S.A. and S.S., as well as a considerable number of tank and aircraft engineers, who had been working in Swedish and Russian munition factories.

The reconstruction of the Army was at once taken in hand, when a clash of opinions occurred between the S.A. and the Reichswehr, Ernst Röhm, Chief of the Staff of the former, aiming to become "top dog." This led to the purge of June 30, 1934, when a little over a month later Field Marshal von Hindenburg's death resulted in Herr Hitler being decreed Führer and Chancellor.

The first great turning-point came during the following spring, when, on March 10, it was announced that a powerful German air force was already in existence. The second was to follow, for, on the 16th, Hitler startled the world by announcing that Germany had that day passed a law reintroducing conscription, and that the new army would consist of 550,000 men organized into twelve army corps of three divisions each. This was easily effected by pouring the cream of the S.A. and S.S. into the Reichswehr.

Six months later the first Grand Manœuvres held since 1914 took place in the neighbourhood of Lüneburg, which I attended, and as I was the sole foreign press correspondent present, the remarks I made at the time may be of some interest.

From the point of view of mechanization, it was at once clear

that, as the German Army had been forbidden to possess tanks, its leaders had been compelled willy-nilly to think in terms of anti-tanks. To them, this was a godsend, as I wrote at the time :

> "Tactically, this is a most enviable position to be in. No old machines hang round the German military neck—as, for example, our 1923 model Vickers tanks hang round our military neck. And be it remembered that old weapons mean old tactics, and new weapons mean new tactics, because true tactics do not consist in an application of rules, but in developing the power of a weapon and then of all weapons in combination."

Was this realized ? If it were, then :

> "Should this General Staff recognize that it must scrap past tactical theories, and should it possess the courage and also the humility to go back to school again and begin from a new beginning, then the tactical possibilities of the German Army are overwhelming."

Why ? Because this army already possessed the most formidable anti-tank units in Europe, and all that was now necessary was to hinge on to them well-equipped and well-trained tank units, when the combination between "shield" and "sword" would be irresistible, unless confronted by its like.

Though I came to the conclusion that as regards mechanization there was nothing to be learnt from these manœuvres, yet from the point of view of "spiritualization" I was astonished ; so much so that in my final despatch I wrote :

> "Never do I remember having seen so keen a delight by soldiers in soldiering, or so keen an appreciation of things military as was displayed by the thousands of spectators who had come from far and near to witness the manœuvres.
>
> "In this spirit lies the foundation of German military strength. The rest, important thought it is, is nothing more than common sense.
>
> "From 1919 onwards until this year the German Army was without modern weapons. Consequently, its training has been largely defensive. Now, free from these restrictions, it can change itself offensively.
>
> "It has passed through a hard school, which has taught it much. It has still a lot to learn, and, above all, how to base offensive action on defensive power. That is, how to combine the new mechanized weapons, tanks and anti-tanks, so that the

second become the base of action of the first, and not merely the escort of an obsolescent infantry.

"Whether it will do so depends on the General Staff and its ability not only to understand the past but to foresee the future."

The following year I attended the German Grand Manœuvres again, this time in Hesse, when in one despatch I wrote :

"What is required is not an infantry tank—that is, a machine to protect infantry—but what I will call 'tank-infantry' ; men trained to work with tanks in such a way that, directly an enemy anti-tank weapon is spotted by aircraft or opens fire, it is at once smothered by rifle and machine-gun bullets.

"When we get such a combination, each protecting the other and linked by low-flying aircraft, an ideal co-operation is established and will, in my opinion, always prove superior to mere weight of numbers."

Summing up what I saw, I said :

"So far these manœuvres have shown not only that infantry are unable to break a well-held front, but, what is more important, they are unable to envelop an open flank so long as the enemy has reserves to check them.

"Therefore, indirectly, they have also shown that, if a front is to be broken or a flank turned, resort must be made to tanks and aircraft. Certainly aircraft, because fronts and flanks mean nothing to the aeroplane."

Finally, I wrote :

"In general, the impression left on me is that the German army, as now constituted, is not only a great fighting machine, but also a potent instrument in the regeneration of Germany. Once we understand the German war machine, it seems to me, we shall realize that its creative powers during peace-time are likely to exceed even its destructive powers during war."

Once again it was the spirit of the "whole show" which overwhelmed me, because, so far as I could see, mechanization had not yet begun.

Though from 1935 onwards the German army was outwardly to revert to its mass organization of 1914, inwardly it was in no way inspirited by the old mass idea, which from the days of Napoleon onwards and right into the First World War had been its governing

military factor. Numerical strength, however, was not underrated, instead it was accepted, yet not worshipped; for it was held that vigour, endurance, personal example and above all mobility transcended in value mere numbers of men. Protection was to be powerful, attack audacious and pursuit relentless. Thus the foundations of the new army were built upon one of Napoleon's wisest maxims, namely:

> "The whole art of war consists in a well-reasoned and extremely circumspect defensive, followed by rapid and audacious attack."

Nothing was to be left to chance, all situations were to be considered and mentally prepared for.

This demanded that the old unthinking obedience gave way to independence of thought and action. The soldier was told that he should always do something, even if at the moment he did not know what to do. In my handling of soldiers, I have invariably taught them—"When in doubt, hit out!" For inaction in a mobile age is the sin of sins.

Personal example was established as a dogma. Leaders were to live with their men and become part of their lives. Zest for responsibility was to be their first and last thought, and on the parade ground battle training was to be their task and not drill.

Mr. Shirer, in his *Berlin Diary*, talks of "the fantastically good morale of the German Army," and adds:

> "The German officer no longer represents—or at least is conscious of representing—a class or caste. And the men in the ranks feel this. They feel like members of one great family. Even the salute has a new meaning. German privates salute each other, thus making the gesture more of a comradely greeting than the mere recognition of superior rank. In cafés, restaurants, dining-cars, officers and men off duty sit at the same table and converse as men to men. . . . In the field officers and men usually eat from the same soup kitchen. . . . In Paris I recall a colonel who was treating a dozen privates to an excellent lunch in a little Basque restaurant. . . . The respect of these ordinary soldiers for their colonel would be hard to exaggerate. Yet it was not for his rank, but for the man."

In 1936 the most realistic manœuvres ever held, and in importance ever likely to be held by the German army, took place in Spain, to where some five to six thousand troops, mainly of the technical services, were sent not only to assist General Franco, but

also to test out the new German military equipment under war conditions. These men were relieved from time to time, so that during the two and a half years these manœuvres lasted, some forty to fifty thousand officers and men were trained and experiences of incalculable importance gained. On my three visits to Spain during the Civil War I saw little of their work, except on one occasion, because visits to the areas occupied by them were not welcomed.

Turning to the various arms and services of the German army, it is not my intention to enter into detail, because I possess little first-hand information, and because since the outbreak of the war many changes in organization must have occurred.

To begin with, the army consists of both land and air forces, and the combatant arms of the former are divided into the following functional groups : reconnaissance, protective, armoured, motorized and holding.

Though within their specific functions all are of equal value, the most important factor in the German system of attack is reconnaissance, if only because finding is the first step towards attacking. All arms within their own spheres of action are potential reconnoiters, who combine fighting with finding. In short, it is they who initiate the battle. Thus flights of aircraft precede the advancing land forces not only to discover, but to clear their way. Swarms of motor cyclists, drawn both from the specialized reconnaissance units and the motorized troops, cover the advance in *all* directions, in order to seize and to hold as well as to discover. The old idea of the advanced guard gives way to that of the swarm, using Scythian tactics. Wilhelm Necker, in his book *Hitler's War Machine*, describes their activities as follows :

> "These motor-cyclists hasten on in advance of the larger unit, clearing a way for it, creating and holding narrow passages, making a bridge head and occupying what might prove important heights. They appear on the enemy's flank and in his rear and attack him and his batteries with machine-gun fire. In the same way they attack columns, staff headquarters and railways. They destroy railway lines and bridges. Should the reconnaissance tanks encounter obstacles, the motor-cyclists stop to remove them as well as any mines that may have been laid. At the same time they hamper enemy reconnaissance by barricading, laying obstacles, etc. After reconnaissance tanks have passed, a machine-gun nest may reappear and open fire in the rear. If so, motorized rifle battalions will deal with it. Lastly, they are used to roll up from a flank an enemy front already broken by tanks."

Hand in glove with these ground reconnaissances work the pro-

tective anti-tank units, whose duty is not merely to beat off enemy tank attacks, but to attack in order to clear the way. Frequently the Flak artillery (to be mentioned later) is also sent forward for this purpose. Only when the main bodies in rear of them approach do the anti-tank units form themselves into a protective shield, and not necessarily within close range, but rather in such localities where enemy tanks are to be expected.

From this it will be seen that, in contrast to the French and British ideas on anti-tank work, the German are far more offensive in intent.

Turning to the main attacking forces—the armoured and motorized troops—the master-idea in their tactics is velocity, to which everything is subordinated. As we are told: "The task of military motorization is to strive for a maximum tactical and operational mobility and speed, so that the army may be able in the shortest possible time to develop a maximum fighting strength at the fulcrum of the battle, in order that it may thus prove superior at the decisive point, even if inferior as a whole."

The first tanks were built in 1934, or possibly 1933, and were light two-seater machines copied from the British model, which was not improved upon. In 1936 a tank training school was established outside Berlin, and that year two armoured divisions were raised, to be increased to at least ten by the summer of 1939. Each consisted of from 400 to 450 machines: a light machine-gun tank, a twenty-two-ton medium tank, a thirty-six-ton heavy tank, and a still heavier one carrying two field pieces or howitzers. At that time these machines were organized into regiments of three sections, of three batteries, of two squadrons of two tanks each.

The origin of the second—the motorized troops—is largely to be found in the creation of the National Socialist Motor Corps or N.S.K.K. (*Nationalsozialistisches Kraftfahrkorps*), a voluntary organization on the lines of the S.A. and S.S. In 1934 its object was to make Germany the most powerfully motorized country in Europe, because "the higher the degree of motorization, the stronger the defensive power of the nation." By 1935 its membership numbered over half a million, and brigade and regimental organizations were adopted.

Motorized troops may be divided into three main categories—namely, motor-cycle rifle men; motor rifle battalions using in the main motor-cycle combinations, and motorized rifle regiments carried in lorries. Other motorized services of course exist, such as the reconnaissance and anti-tank units already mentioned, also machine-gun battalions, engineers, artillery, bridging and signalling services.

The motorized regiments follow as close as speed and oppor-

tunity permit in rear of the armoured forces in order to widen the breaches made. In short, they provide the necessary man power (volume) to hold what has been conquered and to protect the communications of the armoured troops.

In turn, their work is taken over by the holding troops—marching infantry and horse-drawn artillery. The tactics of both these arms are based on the occupation and holding of areas rather than of lines—that is, both in breadth and depth the troops are so distributed that they can rapidly front in any direction.

As regards the German air force, I will here solely examine the problem of the Stuka or "power-diving bombing machine" and the use of Flak or anti-aircraft artillery. The first surprised both the French and the British in 1940, in spite of the fact that a considerable literature had already sprung up around it, which could be bought at any German bookstall. For example, General Einmansberger—with whom I have corresponded—so long ago as 1937, wrote:

> "The tank attack must be carried out as intensively as possible. . . . Therefore the enemy's counter-fire must be silenced in the shortest space of time. . . . Ordinary artillery batteries are not suited to this purpose. . . . The artillery must be replaced by the aeroplane.
>
> "The airman can look down vertically over the battle-field. . . . The great speed of the aeroplane permits the immediate execution of his plans. . . . The aeroplane is thus the only weapon which can be used to put the enemy's weapons out of action immediately. . . ."

In Spain these tactics were fully and successfully tested out. In *Deutsche Kämpfen in Spanien*, published in 1939, we read:

> "The dive-bombing force attacked small targets in almost perpendicular power dives with bombs of the highest calibre. First developed in Germany a few years ago, it is to-day a dreaded weapon which received its baptism of fire in the fighting around Teruel at the beginning of 1938. These machines, resembling birds of prey, soon gained a reputation among friend and foe alike. . . . Whenever in the following months there was an important objective to attack, be it a bridge, a communications centre, a munitions or petrol depot, troop headquarters, a ship—the Stuka tirelessly undertook the attack and knew only one goal: a direct hit.
>
> "New, stronger and faster machines came as a Christmas gift for the Catalonian offensive. The last engagement of the Stuka, on the Toledo front in March, 1939, brought it a splendid concluding success: four attacks—four direct hits!

"In many hundreds of cases the Stuka proved its military excellence and lived up to its name as the 'sharpshooter of the air force.' "

It has also been fully described in *Der Adler*, published by the German Air Ministry, and in *Die Wehrmacht*, published by the German High Command.

In the above-mentioned book the following information of the Flak (*Fliegerabwehrkanone*) is given :

"From the beginning of 1937 the Flak artillery was used more and more in ground warfare, for which its precise aim, its rapid firing, and its range made it especially suited. The main reason for this was that the Spaniards lacked ground artillery and, in addition, there was the dearth of targets in the air, as the Red pilots were so frightened by the Flak batteries [8 guns] that they seldom came close to the front. This led finally to the use of the Flak in the last great offensive of the Spanish war, in Catalonia, in the following proportions : of the total ammunition fired by these guns, 7 per cent was against air targets and 93 per cent against ground."

Thus used, normally the Flak guns preceded the infantry in attack and were towed into action by tanks.

The whole of the Stuka-Flak-Panzer (tank) tactics were worked out in Spain. No finality had, however, been arrived at when war broke out in September, 1939. The German armies moved forward as experimental forces, yet heading in the right direction, for their General Staff had fathomed the master-idea in war as it is to-day—the idea of veolocity and of volume.

Chapter VI

STOCKADE—BLOCKADE

WE OFTEN WONDER WHY IT WAS THAT, DURING THE FOURTEENTH and fifteenth centuries, in spite of repulse after repulse and defeat after defeat, the Chivalry of France continued to charge English archers supported by men-at-arms. Nevertheless, even more perplexing is it that, no sooner had the Armistice of November 11,

1918, sounded, than the French and British armies abandoned the tactics which during 1918 had won for them so many victories, and reverted to those which from 1914 to 1917 had so dismally failed. Still more astonishing is it that in England the High Command did its utmost to abolish the tank altogether, and undoubtedly would have succeeded in doing so but for strong opposition on the part of myself supported by a few other progressively minded soldiers. After four years of toil we succeeded in saving three cadre tank battalions out of the thirty-five either in existence or being raised when the war ended. Five years later—that is, in 1923, the first new post-war tank—the Vickers Medium—was produced in small numbers, to remain for sixteen years the sole medium machine in the British Army. Compared to this, the short-sightedness of the French Chivalry from Crecy to Agincourt fades into insignificance.

In France it was much the same. Though the tank was accepted as a weapon of war, and not merely looked upon as a freak as it was in England, it was considered purely as an adjunct to the infantry. In 1919, Marshal Pétain, then Commander-in-Chief of the French Armies, laid down in General Headquarters Memorandum No. 7670 that, though "infantry will, in fifty years' time, perhaps, be carried on tanks," for the present "the tank is an infantry arm working in the midst of the infantry." Two tanks were considered necessary—a light and a heavy, or the then existing Renault tank and one of some seventy-tons, at the time under construction. Of the former, the Marshal, like Leonardo da Vinci, laid down: "These should be able to fight in the very ranks of the infantry and so assure its *close accompaniment.*" And of the latter: "These should be capable of progressing over country which is shell-torn, or has been long organized for defence, *in front of the infantry*, in order to make paths for it, and to facilitate the crossing of the light tanks."

No new tank construction was put in hand until the late thirties, and certainly at the time of the outbreak of the Spanish Civil War the bulk of the light tanks remained Renaults, and the heavy numbered some two dozen, which could barely move.

How was it that these two nations, Great Britain and France, who simultaneously invented the tank, were so blind?

In my opinion, the fundamental reason was that, having won the war, both were deprived of the incentive to turn to new political leaders. Russia had already done so, Italy was doing so and Germany was striving to do so. So it came about that the old men of old ideas remained in power, and blind to the fact that economically the world of 1913 had all but vanished, they attempted to refashion it round what, idealistically, was called the League of Nations, but which in reality was a league of central banks. Nevertheless, they

were not altogether blind to the fact that the war had released strange, new forces which they feared, and fear, impinging on their instinct of self-preservation, begot a defensive turn of mind. It was the story of the decadence of Rome and of China over again. They turned to walls—mental as well as material—and in the coolth of their protective shadows solemnly once a fortnight anathematized war and argued:

Had not the World War been a walled conflict? Would not the next war be the same? Had not four years of carnage proved beyond doubt that, in face of the bullet and the shell, the offensive had time and again most dismally failed? Would not it fail next time? Therefore, was not Clausewitz right when he held that the defensive was the stronger form of war? Thus, sub-consciously, they convinced themselves, and thus did the defensive attitude of mind grow until it embraced everything—politically, economically, socially and militarily. In France the outcome was the building of that monument of defeat—the Maginot Line. In Great Britain—adherence to the Blockade—or perhaps, more correctly put, trust in its parent, the castle moat called the English Channel. Thus it came about that the stockade-blockade theory of war grew and governed the military thought of the victorious powers, imprisoning them in its obsolescence.

I will now examine these two complementary obsessions in more detail.

The Maginot Line was, as I have said, a memorial of defeat. During its construction this was clear to me, because its sole idea was the *defensive à outrance*. In 1936 or 1937 I even went so far as to write an article—which no editor would look at—entitled "The Tombstone of France,"[1] in which I pointed out that whereas Hitler, in order to develop German war mobility, was using his concrete to build roads with, the French were building static concrete fortifications, which in this age of flight were utterly powerless to keep projectiles out. They were, in fact, not armouring themselves with steel, but with the precipitates of fear.

The truth is that France had never recovered from the shock of 1914–1918. Also, her dwindling birth-rate had engendered what may be called a "biological" cowardice. Callous though Napoleon was when on one occasion he exclaimed that the losses of any one of his great battles would be made good in one night in the marriage beds of France, biologically he was right, because, in all countries

[1] In corroboration of this I will quote Arnold Lunn, see his Memoirs—*Come What May*: "The collapse of France is a good example of the vanity of prophesying. Of all those with whom I have discussed the European complex, one man alone predicted with confidence the French failure. In 1938 General Fuller told me that the Maginot Line would prove to be the tomb of France, a phrase I have never forgotten. . . ."

in which climate is invigorating, struggles for existence are finally decided in the cradle. This biological fear emasculated the French army—men were replaced by concrete, or rather their virility was petrified.

Under cover of this substitute for victory—the conception of a weary mind—French military imagination was lulled to sleep, while the French soldier was rotted by the Communism of the Blum Government. From the date of the outbreak of the Spanish Civil War the whole country morally collapsed into corruption. For Red gold French mobilization stores were bartered. I have myself seen milliards worth of French equipment scattered over the battlefields of Aragon, and so wanton was this waste and so all-corroding the corruption which engendered it and the ill-discipline begotten by it that, when the Czech crisis arose in September, 1938, and certain French reservists were called out, the men threw down their rifles and spat upon their cannon. To-day it is customary to deride Mr. Chamberlain for going to Munich, and to decry his policy of appeasement. Yet, seeing that France was less ready for war than at any previous date in her history, what else could he do? Neither could his own country have gone to war with the remotest hope of success, for the same sickness, though in less virulent form, had also inflicted it.

Turning from stockade to blockade, in so many ways its naval counterpart, Heyst shows penetration when he writes:

> "We do not know how this country [Great Britain] will behave. In France the Maginot Line complex was responsible for the quick collapse of French resistance. All rigid notions and *idola* are bound to produce catastrophe when they crumble. All old nations stick to some 'stiff' ideas and axioms. But we still hope that the *idolum* of the sea will not play in England the same part as the Maginot Line complex did in France."

In examining this question, the first point to understand is that throughout history, with few exceptions, sea power has played a subordinate part to land power. Thus, in the case of Carthage, the gaining of the command of the Mediterranean by the Romans would not in itself have been sufficient to reduce that city state, had not they possessed a powerful army. Again, though it was sea power which enabled William of Normandy to cross the English Channel, had he not commanded an army superior to King Harold's he would not have conquered England. In 1588 it was not Philip II's Armada which was dreaded by our Tudor ancestors, instead it was the Duke of Parma's army in the Low Countries. In 1757, it was not our naval superiority over the French in the Indian Seas

which enabled us to conquer Bengal, instead it was Clive's microscopic army; and when two years later Wolfe beat Montcalm at Quebec, and so laid the foundation of the British conquest of Canada, though he could not have gained that great victory unaided by sea power, it was not sea power itself which gained it. The reason is simple: man lives on the land, and unless that land is so barren of food that, like an island city, it can be invested by sea power, he must be conquered on the land by land power.

These somewhat platitudinous comments are made not to belittle the importance of sea power, but instead to bring it into perspective. To an island power, such as Great Britain, sea power is vital, not because it can keep open her food routes—this should not be necessary, and is in fact a purely artificial condition, the result of a faulty economic policy—but because in war, without a superior fleet no army can with safety be transported overseas. Further, unless this is possible, no diplomatic pressure during peace-time can be exerted on continental nations. To do so the British fleet must be powerful enough to gain and maintain command of the sea, and if it is, then in war it is the exception and not the rule that any lesser powerful fleet will chance a meeting. In British history this has resulted in the infrequence of important naval battles and in reliance on blockade as a substitute for them. In other words—on the economic attack instead of the physical.

A little over forty years ago Captain A. T. Mahan—that prophet of the obvious—remarked in his *Lessons of the War with Spain*:

> "The stoppage of commerce, in whole or in part, exhausts without fighting. It compels peace without sacrificing life. It is the most scientific warfare, because the least sanguinary, and because, like the highest strategy, it is directed against the communications—the resources—not the persons, of the enemy. It has been the glory of sea power that its ends are attained by draining men of their dollars instead of their blood."

Though this may be true in theory, in fact, as the First World War proved, no system of war carries with it so much suffering and loss of life as a prolonged blockade. Further, in an industrial civilization, no other method of attack produces such universal ruin, not only to victor and to vanquished, but to all neutrals as well.

Further still, I do not think—though in this I may be in error—that Mahan appreciated the steady decline in the value of blockade between the Seven Years' War and the outbreak of the First World War, which I feel he should have done, for he did not die until 1914.

Though blockade has always been directed against the enemy's war strength, the nature of that strength has not remained constant.

Thus, in the agricultural period of civilization, normally the stoppage of food did not bulk large, because all countries, in this respect, were self-supporting. Therefore, blockade did not hit at the nation *en masse,* instead at its armies and fleets by depriving them of essential supplies, and also at its ruling class by cutting off their foreign luxuries. But, when the Industrial Revolution set in, all this began to change. Not only did many luxuries become necessities, but more and more did European nations become dependent upon the importation of both food and British manufactures. This became apparent during the Napoleonic Wars, with the immediate result that, as blockade begat counter-blockade, the cutting off of British produce created an incentive among neutral nations, more particularly America, to increase or establish industries of their own. Therefore, even if blockade ended in strangling an enemy fast gripped by British and Allied land forces, as was the case in the First World War, simultaneously it gutted British overseas markets, either by compelling neutrals to increase their home manufactures or to import such articles as they needed from a neutral power—again more particularly from the United States. This curious, inverted and unintentional process of transferring by means of blockade the sources of British wealth to America is once again taking place in the present war. And should it be a war of long duration, even if the British blockade once again succeeds in strangling Germany, it will end by also strangling British industry and compel Great Britain to revert to agriculture.

That it will single-handed succeed in strangling Germany would appear, however, to be highly improbable; because blockade, in order to become effective, must not only be made total, but must be linked to extensive land operations which, as it tightens its clinch, will simultaneously exhaust the enemy both physically and morally. Though food is one of the two great abutments of strategy, the other is—morale.

Nevertheless, since Mahan wrote and died, machine warfare has steadily and increasingly crept into the foreground, oil power coming to the assistance of the blockaded nation in the form of the submarine and the aeroplane—both three-dimensional weapons. What was the result, so far as the first of these two weapons is concerned? In spite of Great Britain's overwhelming naval superiority, in 1915, 568 British, Allied and Neutral ships were sunk; in 1916, 1,098; in 1917, 2,639, and during the first ten months of 1918, 1,103. That is in all, 5 408 ships, representing 11,189,000 gross registered tons. In these operations the Germans lost 203

U-boats ; therefore the average number of vessels to U-boats sunk was between twenty-six and twenty-seven. Though, during 1918, this form of attack was checked, it was in no way checkmated, in spite of the fact that no less than 5,000 surface vessels were employed to protect British and neutral shipping against the twenty or so submarines Germany daily kept at sea. Had she been able to multiply this number by two, there can be little doubt that she would have won her naval war, and by means of her counter-blockade have forced Great Britain to capitulate.

In spite of this devastating fact, what did the British Admiralty do? No sooner had the war ended than it set the submarine aside and got back to the 1914 big battle idea. Farther back still, for whereas in 1914 submarine totals, built and building, were: Great Britain, 66; Germany, 37; France, 62; the U.S.A., 40, and Japan, 8; in 1936 they were: Great Britain, 60; Germany, 36; France, 90; Italy, 77; the U.S.A., 100, and Japan, 67. In other words—while in 1914 Great Britain was the leading submarine power, in 1936 she was fifth on the list. Also, while in 1914 she possessed 298 destroyers, flotilla leaders and torpedo boats, in 1936 she possessed 169 and was building only 43. In fact, but three years before the outbreak of the present war, she was, from the submarine point of view, in a worse position than during the First World War, and yet between 1922 and 1936 £776,000,000 had been spent on the British Navy!

As it is so easy to be wise after the event, I will here quote the views I held in 1936. That year I wrote in my book, *The First of the League Wars*:

> "The first question to ask ourselves is: In the face of an enemy possessing a powerful air force, could a blockade such as we established in the World War be maintained long enough to prove effective? My answer is 'No.' . . .
>
> "The truth is that in European waters, which are comparatively narrow, it is aircraft and not submarines or surface craft which will prove the more effective means of making and breaking a blockade. In fact, a new form of blockading will have to be developed, the aim of which is not to bottle up a harbour or scour the seas for enemy merchantmen, but to keep the enemy's ports under constant or intermittent bombardment. First, to throw their inhabitants into panic and so prevent unloading; secondly, to destroy their wharfs, warehouses, etc., and thirdly, to prevent merchant ships from entering them. In narrow waters it is obvious that the most powerful weapon of economic attack is no longer the submarine, but the aeroplane or seaplane. . . ."

I next turned to the complementary problem—the freedom of sea communications, which, on account of her un-self-sufficiency in foods, is absolutely vital to Great Britain.

I pointed out that the axis of the British Empire consists in the sea communications running westwards from New Zealand to Canada, and that its central sector, from Aden to Gibraltar—a distance of over 3,000 miles—passes through narrow waters. And, then, I asked the question: "What does this mean from the point of view of hostile air power?"

To make this problem as clear as possible, I placed it on a land footing—an army fighting in a mountainous country, such as the North-West Frontier of India, and wrote:

> "When faced by the passage of a defile, what does a general do? Does he meander into it, pitch his camp and wait for his enemy to attack him? No; he first pickets the summits of the hills flanking it, so that (1) he is not bottled up, and (2) that his line of communications is protected.
>
> "Turning to the Mediterranean, a moment's thought will tell us that, to-day, it is no longer a strategical sea, as it was in the days of sailing-ships; that it is no longer a tactical lake, as it was forty years ago—that is, before the advent of submarine and aeroplane. What is it, then? *It is a canal and nothing more*, almost as much so as the Suez Canal itself, and infinitely more so than the Channel and North Sea were in 1914."

Next I pointed out that it was not the static fortresses—Alexandria, Malta, Gibraltar, etc.—which were of first importance, but instead the *mobile* areas—the areas of greatest aeroplane mobility:

> "(1) Genoa to Corsica—Sardinia to Cape Blanco.
> "(2) Rome to Sardinia—Sardinia to Sicily—Sicily to Cape Bon.
> "(3) Strait of Messina—Sicily to Malta—Tripoli to Malta."

Thus, we come to this: It is because blockade, like stockade, is a static conception adhered to in an age of ever-increasing mobility that, as a means of waging war, its values are on the wane.

If in my many writings on the character of present-day warfare I have shown prevision, it is not because I am a clairvoyant, but because I saw in mobility, which I prefer to call "velocity," the key to both offensive and defensive operations of war, and refused to consider either *per se*.

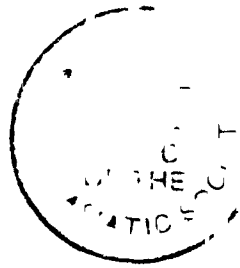
This "open sesame" to all present-day war problems was in greater part grasped by the German High Command, and it was

not grasped by those of either France or Great Britain. They were discussing the offensive and the defensive, as if they were things in themselves, when the crucial problem was the influence of velocity upon both. In other words, the problem was one of time and space and not of mass and matter. The British outlook was simply extraordinary. Nothing could wake the British Government or its Service Ministries from their Rip-van-Winkle sleep. Wars came and went, yet not the slightest notice was taken of the innumerable lessons they had to teach.

Graphically, this attitude of mind was depicted in *Punch*—that journal of wit and humour of the British bourgeoisie. Towards the close of 1937, when the question was fiercely debated whether the Royal Scots Greys—a cavalry regiment raised in 1681—should remain horsed or be mechanized, a picture appeared in that periodical showing a trooper mounted, St. George-like, thrusting his sword into a modern dragon in the shape of a crumpled-up tank. Underneath appeared these truly classic words:

> "In commemoration of the good news that this famous regiment has successfully defied mechanisation."

It was this "good news" and this "defiance" which lay at the bottom of the whole tragedy.



PART TWO

MACHINE WARFARE IN THEORY

"Secrecy and celerity are the life of dispatch in all military operations."
—*Francis Bacon.*

Chapter VII

THE ELEMENTS OF WAR

THE OBJECT OF ALL MILITARY ORGANIZATION IS TO ENABLE THE primary tactical functions, according to the circumstances of the moment, to express themselves in the most effective way; and though the organization of a present-day army is exceedingly complex, these functions remain simple and invariable.

To understand what they are, all that is necessary is to reduce the battle—the central act in war—to its simplest possible form, and then observe what happens. When two men fight, whatever the stake may be, they have got to guard, to hit and to move. Whether they are armed or unarmed, or whether they are fighting on foot, on horseback or from within a machine, these three functions remain constant. Multiply the two men to any number and the result is exactly the same. Therefore it follows that all organization to be tactically efficient, must express these three functions, and the more readily, rapidly and effectively it does express them, the more perfect it is in itself. The things which enable the soldier to give effect to these functions of guarding, hitting and moving—namely, means of protection, weapons and means of movement—I have generally called the physical elements of war, and out of their combined use tactics, or the art of fighting, is evolved. With reference to this, Marshal Foch once stated that all systems of

tactics should be based on "resisting power" (guarding) and "striking power" (hitting). Moving he took for granted.

This is a universal idea. For instance, in Balzac's *Contes Drôlatiques* we read of a certain Captain Cochegrue of whom it is related: *"Dans les grosses batailles, il taschoyt de donner des horions sans en recevoir, ce qui est et sera toujours le seul problesme à resouldre en guerre."* (In great battles, he endeavoured to give blows without receiving them, which is and always will be the sole problem to solve in war.") And why? Because the resultant is freedom of movement.

What has not been so universally accepted is the relationship between the tactical functions and the tactical means; for in most armies weapons have evolved on no rational plan. New arms, as frequently as not, have been invented and adopted without any definite tactical idea behind them. Old weapons have been maintained and the old and new mixed irrespective of their functional values. So much so has this been the case that, as an introduction to the following chapters of this Part, I will in this one briefly examine some of the characteristics of movement, weapons and protection.

The Element of Movement

The three elements of war are so closely related that they cannot be separated one from the other. Thus, both weapons and protection depend upon movement, and in war movement must have some offensive purpose, and in turn it must be protected if force is to be economized.

There are three forms of movement—human, animal and mechanical. There are three vehicles of movement—earth, water and air. And there are three dimensions of movement—one-dimensional, such as movements along roads and railways; two-dimensional, such as movements over land and water surfaces, and three-dimensional, such as movement under-water and through the air.

There are also three types of military movement—strategical, tactical and administrative. Tactical movements, which are the ultimate aim of strategy and administration, may be divided into protective and offensive movements. The first I will call "approach movements," and the second "attack movements." During the former the one thought of the soldier is to prevent himself from being hit, and during the latter it is to hit his enemy. The more he can hit, the less he will be hit, therefore, indirectly though it may be, not only is the whole action protective in character, but it becomes more and more secure as the offensive succeeds.

From this it will be seen that any idea of thinking of the offensive and the defensive phases of war, battle, or fight, as separate and distinct acts is wrong, because these two acts are, in fact, the positive and negative poles of the tactical magnet called "battle."

If we remember that the object of all attack movements is to develop weapon-power against an enemy, and of all approach movements to prevent the enemy developing weapon-power against ourselves, we shall at once understand that, when we are not attacking, we are approaching, even should we be sitting in a camp five hundred miles away from the battle-front. If the soldier remembers this, he will seldom be surprised, and surprise is far easier to effect to-day than in the past, because aircraft can almost as safely attack back areas as front lines. The correct appreciation of the approach and the attack carries with it the maximum of security and offensive power. These can never without danger be divorced.

Rising from battle tactics to campaign tactics, the same idea holds good. We are confronted first by strategical movements, and secondly by tactical. In brief, the whole of strategy consists in placing an army in such a position that tactical movements can be carried out with the greatest economy of force.

The Element of Weapons

Offensive intent is expressed by means of weapons, and in organized warfare man can seldom protect himself without them. Weapons have three purposes: to kill, to injure and to terrorize. There are three kinds of weapons: weapons for thrusting, for hurling and for asphyxiating. The first I will call shock-weapons—such as the lance, sword and bayonet; the second, missile—such as the arrow, bullet and shell; and the third chemical weapons—such as gas, lethal or vesicant, and toxic smokes. Other weapons may be added, such as the club for stunning and germs for spreading disease; but, generally speaking, we need only think in terms of two types—according to the means used in moving them—namely, those wielded by man and those discharged by mechanical or chemical force.

In primitive warfare hitting and hurling weapons were combined in a chipped stone, which, when held in the hand, could be used as a shock weapon, and as a missile weapon when thrown. To throw a stone is a protective act, which, should the projectile hit the man it is aimed at, will delay or prevent him approaching to shock distance. At this range brute force predominates and skill is reduced to a minimum; consequently the whole process of organized warfare has proceeded along the line of obviating the rough and tumble of body-to-body fighting. So much has this been the case that, to-day,

we find, because of the invention of automatic weapons, the physical assault, as it was conceived a few years ago, is dead. Nevertheless, when infantry could assault their like, the infantryman's true offensive weapon was his bayonet and his true protective weapon—the bullet, because it covered the bayonet advance. From this we can deduce that, whenever two weapons of unequal range of action are employed, the one of longer range is always the protective weapon and the one of shorter range the offensive weapon, and even should three or more weapons be used, this holds equally good. Thus, though field-guns, when covering a rifle-attack, are acting protectively to the rifles, they are acting offensively to the heavier guns in rear of them, in spite of the fact that these heavy guns are simultaneously acting protectively both to them and to the rifles.

It may be considered that this is a purely academic problem; yet it is not. Its full appreciation, in fact, forms the backbone of the attack, from which the whole battle organization, like ribs, radiate. From this appreciation may be deduced a tactical rule of high importance—namely:

In all circumstances the longer-range weapons must be employed to facilitate or ward off the employment of the shorter-range weapons.

The soldier must not only never forget this rule, but it must so completely dominate his thoughts that its application becomes instinctive, for it forms the foundation of fire-supremacy—the shock by missiles—that crucial act of the attack, the paralysing of an opponent's power to hurl, so that he may be hit and his strength destroyed.

Every missile which can effectively be thrown, must be thrown. The soldier must not only think, but live and act in terms of fire-supremacy; for it is his sword and his shield upon which his tactical life depends.

I have called the above tactical act a rule, because it is open to exceptions. Soldiers may, on occasion, be equipped with offensive weapons of so low a power that for practical purposes they are worthless, or else in battle they may be faced by an opponent so indifferently organized and trained that they can destroy him at long range without the necessity of clinching with him.

Having now shown what an important part protection plays in movement and in the use of weapons, I will consider it in itself.

The Element of Protection

The first fact in life which strikes us is that the instinct of self-preservation urges protection in one form or another, and the second—that protection demands activity or resistance, or, better still, the two combined.

When we examine Nature we at once see that, so far as things living are concerned, nine-tenths of their activities are in character protective. In the animal world we find every type of protection sought after and applied. Few studies are more profitable to the soldier than that of natural history, which is an unbroken record of wars. This fascinating study I cannot pursue here, so I will turn to the elements of protection.

The defensive has little to do with holding a position, for it is just as much part and parcel of every forward movement as of every halt. Static warfare is offensive warfare localized, because the aim of both sides remains quite as much to win as to avoid defeat. A purely defensive—secure—war means that the object is to return to the conditions existing before the war began ; therefore that the war has lost its meaning, for to wage war and return to the *status quo* is simply to squander human energy.

I have already pointed out that the bullet protects the bayonet and that the approach secures the attack. Both these forms of protection are indirect—that is to say, they do not ward off blows, but instead impede the enemy giving them, either by delivering blows or by rendering the target invisible or difficult to hit.

Besides the numerous indirect means employed to protect the soldier, a number of direct ones are made use of, such as armour, earthworks, fortifications and gas-respirators. Again, all these means of economizing hitting-power may be divided into static and mobile direct or indirect protection.

Of all these means, those endowed with the power of mobile direct protection are the more effective, because not only does direct protection nullify a blow at any given spot, but, should it be endowed with mobility, it can be carried, like the carapace of a tortoise, from place to place. As we have seen, the tank falls within this category, which is not the least of the reasons why it has so radically revolutionized the art of fighting. Further still, the aeroplane, by raising war into the third dimension, has, as I will show, in combination with the tank so furthered this revolution that nothing in any way comparable to it can be found throughout the whole course of military history.

From this brief examination of the elements of war it will be seen that, though their powers change, the functions they express remain constant. These changes are due almost entirely to civil progress and inventions. When civilization largely depended on brigandage instead of commerce, and when roads were few and generally unfit for wheeled traffic, military power was founded on mounted troops. When this epoch was succeeded by a more stable agricultural one, infantry became the predominant arm ; and to-day, because manufacture has become the staple industry of all great

nations, and because it is based on science and inventions—coal, steam, chemicals, oil and electricity—the result is that the infantry cycle is rapidly being replaced by a "mechanical" or "mechanized" one.

From this law of military development, as it impinges on man's instinct of self-preservation, a guiding principle is born, which I will call "the constant tactical factor." It is this: Every improvement in weapon power, means of movement and protection has aimed at lessening terror and danger on the one side by increasing them on the other. Therefore every improvement in weapons, etc., has eventually been met by a counter-improvement which has rendered the improvement obsolete; the evolutionary pendulum of weapon power, slowly or rapidly, swinging from the offensive to the protective and back again in harmony with the speed of civil progress; each swing in a measurable degree eliminating some form of danger. Thus, in the days of the stone age, when progress stood almost at a standstill, weapon development was proportionately slow, and may be said to have been always up-to-date. To-day conditions are diametrically reversed, for civil progress is so intense that there is not only a likelihood, but rather a certainty that in peace-time no army can in the full sense be kept up to date. This means that, in war-time, weapon evolution will be rapid, and therefore that the army which is mentally the better prepared to meet tactical changes, will possess an enormous advantage over all others. Here we touch upon the secret of German tactical successes in the present war.

So long ago as January, 1919, when writing on this subject, I said:

> "Tools, or weapons, if only the right ones can be discovered, form 99 per cent of victory. . . . Strategy, command, leadership, courage, discipline, supply, organization and all the moral and physical paraphernalia of war are as nothing to a high superiority of weapons—at most they go to form the one per cent which makes the whole possible.
>
> . . . . .
>
> "In war, more especially in modern wars, wars, in which weapons change rapidly, one thing is certain, and this is—that no army of fifty years before any date selected would stand 'a dog's chance' against the army existing at that date, not even were it composed entirely of Winkelrieds and Marshal Neys. Consider the following examples:
>
> "(1) Napoleon was an infinitely greater General than Lord Raglan; yet Lord Raglan would, in 1855, have beaten any

army Napoleon could have led against him, because Lord Raglan's men were armed with the Minié rifle.

"(2) Eleven years after Inkerman, Moltke would have beaten Lord Raglan's army hollow, not because he was a greater soldier than Lord Raglan, but because his men were armed with the needle gun.

. . . . . .

"Thus we might continue our comparison. Lord Roberts, in 1900, would have defeated, almost with impunity, any Prussian army of 1870; and to-day any army of 1919 would defeat an army of equal numbers equipped as armies were in 1914. Only five years separate these two dates, yet the whole craft of war has changed. Not because rifles, bayonets, sabres and lances are used differently, but because machine-guns have multiplied, automatic rifles have been added, tanks have been invented and aeroplanes have been improved. In fact, the war as waged in August, 1918, is in many respects as different from that of 1914 as the war of 1914 is different from that of 1814.

"During the present war we have had a series of vivid pictures thrust under our noses in such rapid succession and so close to our eyes that it is extremely doubtful whether many of us have read aright what they portend—namely, that it is machine-power and not man-power which wins a war. . . . In other words, that war is primarily a matter of weapons, and that the side which can improve its weapons the more rapidly is the side which is going to win. . . ."

With these preliminary remarks on the physical elements of war, all of which arise from out of the fighting functions of man, I will turn to the revolution in the theory of war which has been brought about so largely by the aeroplane and the tank.

Chapter VIII

THE TACTICAL REVOLUTION

THOUGH FROM THE EARLIEST RECORDS OF WAR RIGHT UP TO THE outcrop of the Industrial Revolution, development in the powers of the physical elements of war was so slow as only to become measur-

able over long periods of time, from the opening of the twentieth century, as I have shown, it became bewilderingly rapid. This was mainly due to the vast enhancement of movement rendered possible by the internal combustion engine, which—

(1) Introduced a new dimension of fighting—air warfare.

(2) And by enabling the soldier to fight from a self-moving platform, extended the theory of sea warfare to land operations.

Nothing comparable to such revolutionary changes had followed either the invention of fire-arms or the steam engine ; for they but added to existing powers, whereas the petrol engine introduced a new dispensation. Something so original, so all-embracing, so all-penetrating that, in the theoretical realms of war, whole epochs were smitten from their hinges. Nevertheless, the functions of the fighting man remained what they always had been—namely to move, to hit and to guard ; consequently, in theory, the problem remained simplicity itself ; how, in the changed conditions which now surrounded the soldier, to translate these functions into actions with the greatest economy of force. It was a problem of common sense—nothing more.

In order to simplify the problem, to begin with let us ask ourselves this question : What is an aeroplane ? It is a ladder which, like a fire escape, enables the soldier to climb into the third dimension and within it rapidly move from place to place. It can be "erected" not only over the battlefield, but also hundreds of miles around it in all directions—up, down, forwards, backwards, to right and to left. The up and down are its fundamental novelties, because, in common with the soldier on the ground and the sailor on the sea, it shares the remaining four directions. Nevertheless, these two directions—up and down—were by no means novel in idea, but only in extension of idea. Hitherto the soldier had fought in lines and columns—stationary or in movement—upon what is called a "battlefield"—that is, a surface of earth. Hence his tactics and hence his organization have been in bulk planary and in detail linear. But, because these surfaces are seldom as level as a billiard table, in the past what do we see ? The soldier instinctively attempting to gain control of the plane he is fighting on by taking up what is called "a commanding position"—that is, by moving into the third dimension. He occupies a ridge or a hill top, he climbs a tree, he builds a tower and even rolling ones. In short, he has always sought to get above his enemy, so that he may look down on him, shoot down on him, move down on him or impede his enemy moving against him. Thus we find that in the past, as to-day, power to move in the third dimension of space has added to his powers of moving, hitting and guarding, both directly and indirectly.

It was the mechanization of this urge to raise himself above his adversary which constitutes the supreme tactical triumph of the aeroplane. So startling were the possibilities of this revolution that in every country a school of military thought arose which saw in the flying machine the downfall of armies and navies—in fact, their eventual extinction. The leading exponent of this school and its tactics was the Italian General Giulio Douhet.

In my opinion these enthusiasts were so carried away by the revolution that they overlooked the fact that every machine is possessed of limitations as well as powers. The most prominent of these was inherent in the very idea of the aeroplane itself. It was built to fight gravity by velocity, and in consequence *can only function when in motion.* Armies can both move and rest on the earth, and navies can move or rest on the sea, but as a fighting machine an aeroplane must fly, for when at rest its tactical powers vanish. It is pre-eminently and fundamentally a moving weapon. Herein is to be discovered the Achilles' heel of air power—the master limitation of the aeroplane. Gravity is its most formidable enemy, because, sooner or later, it forces it to earth. Like a bird, it cannot fly for ever; therefore its resting-ground must be protected. Thus we return to warfare on the surface of the earth, where, as I have said, the aeroplane ceases to be a weapon of war.

As this is an uncontradictable fact, the next question which arises is the tactical relationship between ground and air—that is, between planary and spacial fighting. Here the first point which strikes us is, that to lines and columns as fighting formations have been added a third—the cube. Not a comparatively rigid formation like the other two, but an expanding and contracting formation, a formation which can ploy and deploy in space. Further, because, when not in flight, the aeroplane demands an area, its airfield to settle upon, in turn the protection of these plane surfaces demands area and not linear formations. This introduces the tank—its complement.

Under protection of its armour the tank can move in any direction over normally level ground, and as it can also fire when in movement it is the ideal area weapon. When it co-operates with the aeroplane, what do we see? That it is its ground shield, whereas the aeroplane is the sword which thrusts outwards from that shield. These two weapons are as complementary as once were castle and sally party, bowmen and men-at-arms, infantry and cavalry, and later artillery and infantry. Consequently, how to combine and control cubic and planary formations is one of the crucial problems in machine warfare.

Examine the Diagram, for the answer is given there in theory.

What do we see? A cube "A" standing on the earth, and in the centre of its ground surface a plane "B." The figures represent miles and are inserted purely for purposes of illustration.

Suppose that the length of the frontage to be attacked is 500 miles, then ten of the above cubes will be required to cover it, and granted a flying speed of 200 miles the hour, any one cube can reinforce a neighbouring cube in from fifteen to thirty minutes. As for reasons of cost, supply, organization and command, it is not generally possible or desirable to cover the whole frontage with tanks, therefore following the diagram, I will imagine that to each cube is allotted one armoured division or group of machines—the "Bs"—the centre of each of which is fifty miles from the centre of those on its right and left, and granted that tanks can move at an average speed of ten miles the hour, then a five hours' march from them.

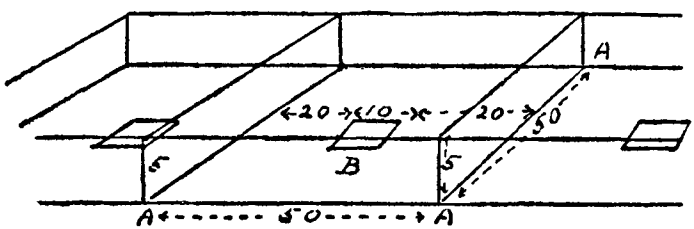


Diagram 1

The point to note is that though, theoretically, the whole front is covered by aircraft, only one-fifth is covered by tanks. Therefore four fifths of the front consist of unrestricted manœuvring ground for the tanks. Therefore, when two mechanized forces meet, frontages at once disappear, or otherwise put—spring up anywhere. As of old, the armoured charge of our modern knights is followed by the mellay. This was correctly understood by the German tank General Heinz Guderian when he said: "Where tanks are is the front."

In this problem of the protection of air bases, the second great limitation of air power becomes apparent. Whereas, in the case of an army, both its base and its battlefield are located on the same plane—the surface of the ground—in the case of an air force they each occupy a different dimension, and not even, like a fleet, a different type of surface. Though soldiers can operate on land for an indefinite period, and ships can remain at sea for weeks and even months on end, aircraft can only remain in the air for a few hours, after which they have to return to earth in order to replenish

their fuel. Though the velocity of an aeroplane is incomparably greater than that of either a ship or a tank, and though, in consequence, its circuit of action is equally disproportionate in terms of time, its supply radius is the most restricted of all three. So much so that this weapon of war closely resembles a humanly regulated and directed projectile, a kind of animated rocket, fired not from a trough or a gun, but instead from an airfield, a "weapon" far more static than the heaviest piece of siege artillery, and one which, in existing circumstances, cannot be moved from place to place, for it is as immobile as a fortress. Whether air power will ever be able to replace land and sea power largely depends on overcoming this limitation, which means that in the long run tactical power is in importance secondary to facilities of landing and supply. If it were practical to devise a portable landing-ground the size of a tennis lawn, and roll it up and unroll it on any normal ground surface, a greater step towards the abolition of armies and fleets would be taken than can possibly be gained by increasing the speed and fighting power of the machine itself. In brief, the future of air power is to be sought on the ground rather than in the air, because the ground is both the bed and the belly of the aeroplane.

Turning back to the problem of area fighting, which is so intimately related to the protection of air bases, this is how I pictured the battle of the future in the *Encyclopædia Britannica* of 1929:

> "The decisive point of attack will again become the rear of the enemy's army. Not only will shock weapons disappear but also the small missile-throwing weapons. The approach will be made rapidly not only by road but also across country, consequently the nature of strategy will be changed. Area warfare will replace linear warfare, and fronts may be anywhere. The attack will be divided into the act of demoralization which is more and more likely to be waged against the command of of the enemy, the brains of his army, than against the nerves of his men. The act of decision will aim more at restricting the mobility of the enemy's main force than in physical destruction of his organization. Once the enemy is held, that is, mobility is denied to him, the act of annihilation will take place.

Such was the machine attack as I saw it some dozen years ago, and, as Part III of this book will reveal, it was not far out of the perpendicular, because I had long before then arrived at the following conclusions:

(1) It would become increasingly difficult, in spite of the

introduction of anti-tank weapons, for mass formations—infantry and artillery—to halt or repulse the machine attack.

(2) The cost of the machines needed to carry out such an attack on the grand scale would, during peace time, drastically limit the number built.

(3) Therefore, though in the next war continuous fronts would in all probability once again appear, they would not be impervious to penetration.

(4) Because, as both the tank and the aeroplane do not require large numbers of men to man them, and as cost loses its meaning in war, vast numbers of these weapons would be built directly war was declared.

(5) That as velocity of movement means attack and when coupled with armour protected attack, therefore the next war would witness the realization of the *offensive à outrance* as dreamt of between 1900 and 1914.

With reference to this probability, in 1936 I wrote in my book, *The First of the League Wars*: "If the enemy's land forces cannot be stopped, then, even under existing conditions, it is possible for mechanized arms to overrun a country such as France, Germany, or Poland in a fortnight. This would mean the complete occupation of all vital points in those countries, and the consequent collapse of their governments."

Discussing this point with an acquaintance, I once said: "Given 50,000 tanks and 10,000 aeroplanes and Europe can be conquered in six months." His reply was: "Where are you going to get the steel, men and money from to build such a force?" In answer, on the back of an envelope I scribbled the following:

> "50,000 tanks at an average of 20 tons a tank = 1,000,000 tons of steel. At an average of 20 men a tank for all purposes = 1,000,000 men. And at an average cost of £20,000 a machine = £1,000,000,000."

To-day the price seems truly insignificant.

As in the remaining chapters of this Part I intend to examine the theory of tank tactics, in the rest of this present chapter I will deal solely with the revolutionary changes effected by the aeroplane.

I have called that weapon a "universal" machine, because its tactical cube includes all fighting surfaces—land and sea—within the limits of its expansion. Hence we obtain a vast number of

different machines which, functionally, may be divided into four main categories :

Function.	*Type.*	*Machines.*
Finding	Reconnoitrer	The artillery spotter or air O.P. The infantry spotter or air scout. The ground spotter or air photographer.
Guarding	Fighter	The counter-fighter. The counter-bomber. The low attacker or air M.G.
Hitting	Bomber	The bomber or air heavy and medium artillery. The dive-bomber or air field gun. The torpedo-bomber or air destroyer.
Supplying	Carrier	The troop-carrier or air 'bus. The supply-carrier or air lorry. The staff-carrier or air motor car.

All these in varying degrees are influenced by the two great limiting factors, gravity and landing grounds, whereas the fighting types possess besides the following limitations :

(1) Low volume fire.
(2) Lack of direct protection in the air.
(3) Inaccuracy of aimed fire.
(4) Inability to occupy.
(5) Excessive wastage.

Volume Fire. The importance of this type of fire is too obvious to need explanation. On the ground it constitutes one of the determining factors in battle. But in the air ammunition supply is not only limited by the lifting power of the aeroplane, but varies in inverse proportion to the distance flown. For example, should the target be 100 miles away from the starting point, more bombs can be carried than if 1,000 miles away. In either case, once the bombs are dropped the machine has to return to its base to re-charge itself.

Lack of Protection. Space being free from material objects, such as hills, ridges, etc., protection is indirect—clouds, height and speed. And though an aeroplane can be armoured, the more it is the lesser is its lift in bombs and petrol. Compared to land weapons its protective powers are severely circumscribed.

Inaccuracy of Fire. Whatever theory and peace practice may dictate and demonstrate, the fact remains that, at present, the crudest medieval cannon is a weapon of precision when compared

to the most recent bomber fitted with the most perfect bomb sights. Though aim has undoubtedly improved, from observations during the Spanish Civil War I came to the conclusion that a bomb dropped from a height of 10,000 feet or over, may fall anywhere within a radius of half a mile from the target—an error of twenty-five per cent the range!

Inability to Occupy. Though parachutists can be dropped and by means of gliders and from troop-carriers men can be landed, the general inability to occupy a position in strength—for the time being anyhow—rules out the aeroplane as a conquering machine. To terrify an enemy into submission is not enough; because, even if only for reasons of moral superiority, a war cannot be decisively, that is, uncontradictably won, unless the enemy's country is occupied and he himself disarmed.

Excessive Wastage. This limitation prohibits an indefinite increase in the number of machines used. During the last eighteen months of the First World War the average wastage in aeroplanes was between fifty and eighty per cent. per month. Of these casualties but one quarter was due to enemy action, the greater number resulting from crashes on landing. What the figures for the present war are I do not know, yet, in my opinion, they are unlikely to be less than a complete turn over once every three months. If so, when the popular press clamours for 50,000 machines, then 200,000 will yearly have to be built to keep that number on the active list.

Bearing all these limiting factors in mind, many years ago now I came to the conclusion that, though the revolution effected by air power was incalculable, the idea that air forces could replace armies and navies and conquer on their own was absurd, and was likely to remain so until the flying machine can land anywhere and can overcome for weeks and months on end the force of gravity. It is, therefore, like every other weapon of war, a co-operative instrument. Nevertheless, its power of attack is formidable and all-embracing; for not only can aircraft fight their like, but also attack civil and military targets. These I will consider in turn.

Because present-day warfare sets no limits to barbarity, and therefore varies in character from medieval, the coming of the air assassin is so degrading an event that more probably than not in years to come it will be examined as a pathological incident. Nevertheless, as realists, we must accept things as they are.

Like a thief, the most profitable time for an aeroplane to launch its attack on a civil target is during hours of darkness, the aim of its pilot being to destroy things and lives. The first is accomplished by the bombing of military objectives, such as industrial areas, seaports, rail centres, capital cities, factories, cornfields,

power stations, etc. In short—all the potentials of civilization; for the purpose of such attack is total destruction. The second is directed against the civil population itself, its aim being to terrorize men and women into rebelling against their Government, and thus compel it to sue for peace. This particular form of brutality is called the attack on the civil will; yet in fact both forms attack the civil body.

Though in these attacks the damage done is frequently considerable, the results arrived at in the First World War, the Japanese-China War and the Spanish Civil War have shown them to be anything but decisive. As regards the first form—the economic attack—the reason is inaccuracy of aim; and, as regards the second, that novelties (ghosts, etc.) terrify humankind more so than known dangers (road accidents, etc.). Therefore, when the novelty of the moral—or rather amoral—attack wears off, though the danger remains, its psychological effect is frequently reduced to vanishing point.

Though, instinctively, I object to these barbarous forms of war and more particularly so the second—which is nothing other than mass murder—I hold that the correct moment to attack the civil will is when conditions are such that bombardments can be maintained for prolonged periods. Further still, "the attack should be launched either immediately after the enemy has suffered a disaster on land or sea, or when some great effo·t on his part has failed, or when an economic blockade of his ports or frontiers is beginning to be felt. It will be seen, therefore, that the correct time to launch the air attack is closely related to events on land and sea. In fact, once land and sea power have been able to restrict the movements of the enemy (tactical or economic) on land and sea, then air-power should take up the mobile operations of the war and direct its attack against the civil will." These words were written by me in 1927.

Turning to the military attack, we know that because aircraft are in no way restricted by terrestrial obstacles, as are a fleet at sea and an army on land, they can avoid fleets and armies, or attack them from above—that is, from a direction which cannot be met by advanced, rear and flank guards. It is this ability to penetrate the normal system of defence, and strike directly at the centre of the surface forces, instead of breaking through their circumferences, which constitutes so great a part of the tactical revolution.

When attacked by aircraft, a fleet, or an army, is always in a defile; yet one of a peculiar kind, because it is unscalable; yet it offers no direct protection to the attacker. Such a defile may be compared to a valley flanked by immaterial mountains which at times can close in on the attacked and so place him in a gorge. To scale these heights at once introduces the air battle.

In 1927, when examining the co-operation of aircraft in naval operations, I wrote :

> "In one respect the submarine is the antithesis of the aeroplane, because she goes down whereas it goes up. Yet both are three-dimensional weapons, the one finding protection in height and the other in depth. It appears to me that co-operation between these two will prove far more effective than the single-handed air-attack. In my opinion, aircraft should take the fullest advantage of altitude, not only to protect themselves, but so that they can manœuvre rapidly above a hostile fleet. They should then not so much attempt to bomb their target as to disorganize its human element, by means of smoke, of a toxic nature preferred. Clouds should be placed on the surface of the sea so that they will either envelop the ship, or force her to tack in order to avoid them. They should be so placed that, if she does tack, she will do so to the advantage of the attacking submarines and destroyers. To compel a fleet constantly to change direction, and to obscure its signals, is to reduce its mobility and to disorganize its gun-fire and command. If the air attack can accomplish this disorganization, it will have fulfilled its task, when it can hand over its victims to the light infantry of the sea."

Tactically, air battles are simpler than those on land and sea, and though this simplicity facilitates organization and training, it does not necessarily accelerate evolution, because, generally speaking, the complex permits of greater combinations. The fact that ground and sea do offer protection, direct and indirect, and the air practically none, must inevitably compel the human brain to seek in them a counter agent to the high offensive power of aircraft and by degrees diminish that power.

Chapter IX

THE PROTECTIVE BASE

TURNING FROM TACTICS—THE ART OF FIGHTING—TO WAR AS A whole, it will, or anyhow should, at once be seen that it possesses a permanent structure, the three elements of which are—bases, communications and battles. The first, as the word implies, are built

around the idea of stability—something which stands firm; the third round that of mobility, whereas the second are the link between them, as a bow string is between the bow and the arrow—what is held fast and what is released.

Of bases there are three types:

(1) The Main Supply Base—the country of each belligerent.

(2) The Administrative Base—that part of an army which does not fight.

(3) The Tactical or Operational Base—the protective organization of that part of an army which does fight.

In days past and before the advent of cubic warfare, the relationships between these three different bases were simple, because the needs of the third were few, its size comparatively speaking small and its movements mainly one-dimensional—by road. The first supplied the second, the second fed the third, which in turn protected both the second and the first.

During the First World War this protection may be said to have become absolute, for not only was the battle front flankless, but so powerfully fortified that for years on end it was unbreakable. Had no solution to this stalemate been discovered, famine would have decided the issue. As it happened it went far to do so, because, as we have seen, it was only towards the very end of the war that machine weapons began to show how mobility could be reinstated.

When we examine the three and a half years deadlock on the Western Front we at once discover that the idea at the back of it is a one-dimensional one—namely, draw a line of impregnable works at right angles to the communications and extend that line until its flanks rest on unattackable obstacles or localities, then not only will the main supply base be securely protected, but also the communications and administrative bases forward of it. It was this one-dimensional defensive idea which begot the Maginot Line, and in spite of the fact that the war had shown that no trench system or wall of works offered the slightest obstacle to flight, and its last few months had witnessed formidable entrenched systems, such as the Siegfried or Hindenburg Line, penetrated by tanks. What was not appreciated was a point I accentuated in my book, *The Reformation of War*, published in 1923—namely: "The tank carries its own roadway in its tracks; it does not, therefore, need a road; it can, therefore, look upon a road or roadless country with unconcern, and in this indifference, without probing very deep, we may discover an entirely new epoch in the art of war—the epoch of roadless tactics." The point missed was this: Should the line be penetrated, as tanks are not tied to roads, once a number have passed through the gap, by wheeling right and left and then swarm-

ing over the open country in rear of the fortified line, that line can be taken in reverse. To counter this, a very different protective system was required—namely, area in contradistinction to linear.

In connection with this subject—the influence of cross-country movement—in 1932 I wrote in my *Lectures on F.S.R. III, Operations between Mechanized Forces*:

> "As communications melt away into broad strategical tracks of country, possibly scores of miles in width, it is obvious that to attack them will become more difficult. Again, because armies will be smaller and far more mobile,[1] it will be easier to turn the flanks of a hostile force and attack it in rear. Both contentions are, I think, correct; but it must be remembered that when an army attacks another in rear it does so to cut it off from its base of supply, and when it attacks its communications its object is identical. It does not really attack a road, or a railway, or an area, for its aim is to sever an army from its base. Should the future prove that this severance is so difficult as to become over risky, or unprofitable, the alternative is to attack the bases instead of the communications. Bases are likely, therefore, to grow in importance, not merely the main base, but particularly the forward ones, and be it remembered the more bases a mechanized army possesses the higher will be its power to manœuvre, just as in warfare at sea the manœuvreability and radius of action of steampships increases in direct proportion to the number of coaling stations, oil depots and defended harbours.
>
> "What does this mean? It means the increased value of field fortifications, not only to defend these bases of supply, but also to block narrow approaches as once did medieval castles and strongholds. One thing is certain, the more mobility increases the more will fortifications increase. Field warfare always begets siege warfare, it did so in the last war, and it will do so in a war between armoured forces, but with this difference: Whereas in the World War fronts were fortified, in a war between armoured forces areas will be so instead. By this I do not mean that an area will be walled in by protective works, but that these works will be dotted about in such a manner as to place the communications of any force entering the area in danger. The difference between these two systems is that of the Great Wall of China compared to medieval castle defence. The one halts an invader; the other does not, instead it establishes a series of

[1] Here I was considering only the mechanized units of an army, not its mass of infantry.

pivots, really bases of supply, between which the invaded can manœuvre in comparative safety."

From these preliminary remarks I will turn to the three categories of bases and examine their protective problems.

The first, as I have already pointed out, includes each belligerent country, and on account of the all-embracing nature of machine warfare all its potentials. Fifty years ago, in the case of a land power, the home base was protected by its military forces, and in that of a sea power, by its naval forces. So long as they held firm, civil conditions, though changed in certain directions, remained normal and life went on as usual. Then came the First World War, when a rapid though by no means radical change set in. Air bombardments were launched on what to-day appears a minute scale; nevertheless, these vertical attacks carried with them in embryo all the lessons which are being so chaotically learned during the present war. This being so, it is of interest to see what the air attacks of the last war foretold.

In all, one hundred and eleven were launched on Great Britain, fifty-two by airships and fifty-nine by aeroplanes, in which 8,500 bombs of all sizes, weighing about 300 tons, were dropped. In the first 556 persons were killed and 1,357 injured, and in the second 857 and 2,050 respectively, the damage done was estimated at some £3,000,000. The total casualties were, therefore, 4,820, an insignificant figure when compared to road casualties, which in 1938 numbered 7,000 killed and 250,000 injured. Nor was the damage excessive, seeing that that due to rats has been estimated at £70,000,000 annually.

The main influences of these attacks were moral and economic. For example, in 1916 there were thirteen different weeks in which the Cleveland area was flown over by hostile aircraft, and the result was that the output of commodities in that district was reduced by 390,000 tons, representing one-sixth of the annual output. Again, during September, 1917, in the works of one large clothing manufacturer the output fell from 40,000 suits per factory to under 5,000. Also on September 30, when a raid on Kent, Essex and London killed no more than fourteen people and injured only thirty-eight, the percentage of hands in the filling factories in Woolwich Arsenal fell by over seventy-five per cent, the output of rifle ammunition, normally 850,000 rounds, falling to nil. Even false alarms emptied entire workships, sometimes for twenty-four hours at a time, and on one occasion a report of an airship off Scarborough led to lights being extinguished in Bath and Gloucester!

From the above may be gauged the tremendous power of air attacks to cripple industry by terrifying undisciplined workers,

and the same will be found when we turn to their influence upon the nerves of the masses of the people. For instance, by the middle of 1917 the population of Margate fell from 30,000 to 16,000. On September 24, 1917, a raid took place in which only fifteen people were killed and seventy injured; nevertheless, 100,000 sought refuge in the London tubes. On the following night another raid took place and 120,000 people did the same. These two raids caused so great a nervousness that on the 26th and 27th, though no attacks were signalled or made, people began flocking to the tubes at 5.30 p.m.

These few figures are sufficient to show four things:

(1) That the most effective result of air attacks on the main base was not the killing of people or the destruction of property, but instead the stopping of work.

(2) That this could be done as effectively by small raids as by large, so long as raiding was continuous—that is maintained day by day.

(3) That the vertical attack had introduced the need for vertical defence.

(4) And that as every man or woman was a potential nerve-target, moral protection was even more necessary than physical, the *levée en masse* had, therefore, taken on a new form and demanded organizing.

Yet very little was done to meet this novel form of attack except perhaps in Germany.

Turning from the main to the administrative bases—that is, the whole of the supply, repair, maintenance and services of evacuation of each army, from which advanced bases (corps and divisional) are pushed forward—once again we find that, whereas in former wars these bases, like the main base, were protected by the combatant forces and in the First World War by an entrenched front, in machine warfare they are not. First, each one of these bases is open to air attack, and will, therefore, require air defences, and secondly, as mechanized forces can move across country, and cannot with any certainty be halted by non-mechanized troops, each base will have to become a fortress. Bases must, therefore, be systematically protected against mechanized and motorized attack, as 2,000 years ago Julius Caesar was compelled to do when faced by mobile barbarians. What will be the nature of these defences?

Examining this question in *Lectures on F.S.R. III*, I came to the following conclusions:

> "They will not be trenches as we knew them in the last war, which were dug to protect the defender, for this type of protection

is now being replaced by armour, which not only protects the defender but the attacker as well. They will be an extension of the same idea which gave birth to wire entanglements. These obstacles were erected to impede the attacker's mobility ; similarly, in anti-tank defences it is mobility which must be attacked—the advancing machines must be stopped.

"Where will they advance? This is far from being an unanswerable question, for a large scale map prepared for mechanized warfare will show at a glance the approaches and areas the enemy's machines are likely to use.

"To halt them and destroy them the following defences suggest themselves : Minefields which will replace wire entanglements and a network of strong points which will largely replace entrenchments. These strong points will probably take two forms : (1) Small redoubts or pill-boxes, and (2) small portable bullet-proof and possibly shell-proof cupolas and shields which can be carried on tracked wagons, and hauled by powerful tractors from place to place."

In short, *in a mobile age all field defences must be mobile*, and as a front may arise in any direction they must be manœuvrable. Had the Maginot Line been able to walk, what a powerful protective monster it would have been. The master-sin was that it was static and not that it lacked power, for it was most powerful.

Collateral to this protective problem is that of the security of the lines of communications linking each administrative base to the tactical base or bases. These also will have to be protected against attack, and an important point to note here is that the farther an army moves from its main base the greater will become the strain of this protection.

Writing again in *Lectures on F.S.R. III*, I said :

"The organization of a line of communications is likely to be as follows : The base depot will be established at some great centre of communications, or at a port. It will be a strongly fortified area impervious to tank and motor car attack, and elaborately defended against aircraft. As the army advances, the area connecting it with the base depot will become the area rather than line of communication. This is likely to assume a conical form as the enemy is approached. In a civilized country this area will contain one or more railways and a number of roads, according to the supply demands of the army. One or more of these will be selected as the main line of communication, and every sixty miles or so will an advanced depot be formed.

If a road is selected, and I am of opinion that in mechanized warfare roads will play a more important part than railways, the general lay-out of the communications will be as outlined in Diagram 2 : *a* is the base depot and *f* the field army, and *b*, *c*, *d*, and *e* are the advanced depots.

"To carry out the protective duties the following distribution of force suggests itself : Each depot will be an extemporized fortress possessing anti-tank and anti-aircraft defences. If spaced at 60 miles apart, each will be responsible for the patrolling of half the distance between it and the last and next depot. This patrolling will be carried out by aircraft and motor-car. Each will be allotted a force of tanks, mainly of the scout and

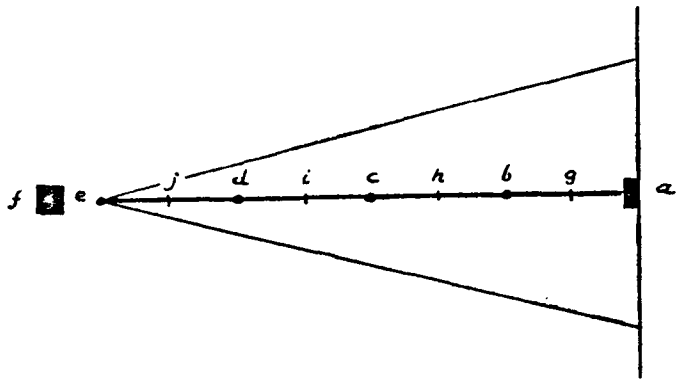


Diagram 2

destroyer classes, which will escort the convoys to the next half-way post. Thus a convoy of vehicles setting out from the base depot will be escorted by *a* to *g*, and at *g* handed over to *b*'s escort which will take it on to *h*, and so on until it reaches the field army. These escorts can work on two systems : they can either accompany the convoy, or, what is more likely, they will move out on its flanks and picket the margins of the area.

"If a protected area of communications does not exist, then, when a convoy and its escort park for the night, the parking place selected should be situated in an anti-tank locality, such as a loop in a river line, or a wooded country which offers few lines of approach."

I will now turn to the third and last category of base—namely, the tactical, and to understand its nature it is necessary to examine it in a more detailed way.

Once again the fundamental idea is that of shield and sword—of mobile direct protection intimately related to mobile offensive power. This idea was fully expressed in Philip of Macedon's military organization, which was further developed by his son Alexander the Great. In it we see an intimate combination between the Companion Cavalry and the Infantry Phalanx—the hitting and mobile powers of the former being based on the resisting and holding powers of the latter, which was a slow moving fortress of pikes, a veritable steel hedgehog. But though to-day infantry are similarly based on artillery, what is the tank based on? At present on nothing in particular; yet, if the art of war is to thrive, hitting power must be developed from resisting power. Therefore, one day this base will have to be provided by what I will call anti-tank troops. Not merely anti-tank weapons, but, instead, a highly organized anti-tank formation, a modern representation of the medieval wagon laager and of the classical phalanx.

In my *Lectures on F.S.R. III*, I wrote: "In my opinion, the future will reveal to us that a mechanized army, or formation, must be organized in two wings—a tank force for offensive power, and an anti-tank force for protective power, the first consisting of mobile machines, and the second of transportable anti-tank weapons which can follow up the first and establish a modern wagon laager in rear of it, or in its vicinity."

The main types of machines required for the tank wing should by name be related to the functions of finding, protecting and hitting, and not as to-day—to their weights. The names light, medium and heavy convey no tactical ideas, therefore these three types should be called reconnaissance tanks, artillery or anti-tank tanks and combat tanks.

Of each of these categories two types are required:

Reconnaissance Tanks: A light quick-moving scout machine and a long, very rapid reconnaissance tank; long, in order to enable it to cover broken ground at high speed and cross trenches, small streams and other obstacles.

Artillery Tanks: An out-fighting weapon and an in-fighting weapon. The first to carry a field gun o howitzer of sufficiently high calibre to enable it to fire smoke shell as well as high explosive and armour piercing. And what I have elsewhere called a scout destroyer, a machine somewhat more powerful than a scout tank carrying an anti-tank machine gun or semi-automatic small-calibre gun. Such a machine, using volume fire, would be particularly useful in close-quarter fighting.

Combat Tanks: A machine of about twenty tons in weight, but longer and more heavily armoured than the normal medium tank, and an assault machine, not so fast but more heavily armoured,

sufficiently so as to keep out all projectiles of lesser calibre than field-gun armour-piercing shell.

Of special machines it is difficult to see where they will end, for as armies become more and more mechanized new types will suggest themselves. The following will certainly be required: an amphibian or water-crossing tank, a supply tank, a bridge-laying tank, a mine-layer, a mine-sweeper or exploder and a gas tank. All tanks of the scout-destroyer class should be equipped with smoke generators and reconnaissance machines should be able to cross water.

As the tank wing is built round the idea of the offensive, the anti-tank wing should be built round that of the defensive rather than merely the protective. By which I mean that its purpose is not that of close co-operation, such as between artillery and infantry, but instead to provide (1) a base of operations from which the tank wing can freely manœuvre, and (2) be so equipped that it can fortify an area in which the administrative services of both wings are halted. As I have said, in conception it is a mobile fortress, in idea identical to the Hussite wagon fortresses of the fifteenth century.

As no such organization exists, it is difficult to say what it should consist of. Nevertheless I consider its combatant arms should include: in- and out-fighting tanks, self-propelled artillery, anti-aircraft artillery, tractor-moved cupola artillery, motorized infantry and motorized field engineers. Further, all administrative services—supply, ammunition, etc.—*should be moved on tracked and not wheeled vehicles, so that, when necessary, they can follow the two wings across country.*

In brief, the idea of an armoured division or formation constituted on the above lines is built round the primary functions of moving, guarding and hitting. It is a mobile fortress with its garrison and its sally party. A fortress which can manœuvre like a battle formation.

Though such an offensive-defensive organization will possess velocity and striking power, a glance at it will show that it is weak in volume and holding power. To revert to Alexander the Great's army, besides its Companion Cavalry and Phalanx it included a large number of lightly equipped units, both cavalry and infantry—archers, slingers and javelin men. In fact a swarm of irregulars, which on the line of march foraged for and protected the main body, and in battle co-operated with it.

This conception introduces motorized troops, which differ from mechanized in that though they are as mobile—even more so than the mechanized—they are unarmoured, and in a present-day army they should be represented by lorry-carried infantry, motorized artillery and motor-cyclist infantry, organized in divisons to work

with and follow up the armoured divisions. Their tactics should be irregular and guerilla—that is, fighting based on a loose order and governed by self-reliance and independence of action. In Frederick the Great's day, Croats, Pandours and Tyrolese riflemen were recruited for this work. In advances they swarmed out in all directions adding volume to the highly drilled, slower-moving professional army they protected, and when the enemy was neared, they cleared to the flanks or rear, to return in volume should he be defeated in order to harass his withdrawal. Their idea was always to circumvent opposition by swarming round it; to prepare the way for the professional army and to hold the ground it conquered.

Lastly, as to conquer is to advance, and as every advance should be made from a firm base, and as it would be entirely wrong to-pin down the mobile formations—mechanized and motorized—a holding or occupying force is also required, as well as troops which can operate in regions unsuited to tanks—mountainous, swampy, or thickly wooded.

Here we return to marching infantry, horse- or tractor-drawn artillery and possibly also cavalry; in fact what may be called the muscle-moved army.

In it the infantry should be of two types: light infantry and pioneer infantry. In idea, the second are the slow-moving tactical base of the mechanized and motorized troops. A base which occupies the region conquered, holds it and organizes it so that administration can function smoothly.

Finally, it must not be overlooked that the whole of the above—the entire army—is the tactical base of the air force co-operating with it. In 1932 I wrote:

> "Without the tank the rear of the air [force] is largely uncovered, and without the aeroplane the front of the tank is largely blind. Therefore we can deduce this fact: That in future warfare co-operation between tank and aeroplane is likely to prove far more important than co-operation between tank and infantry. So important that we may see tanks and aeroplanes forming one force, and infantry a completely separated force."

And farther back still, in 1925:

> "We shall see the commander-in-chief and his general staff replace the boxer. His two fists are his mechanized army and his air force. Sometimes the army will fix the enemy by holding him in front, when the air force will knock him out in rear;

sometimes the air force will hold the enemy in rear, and the army will knock him out in front. Thus, I think, will battles be won, not because one Service does the dirty work of the other, but because both Services are in fact one force. . . ."

Chapter X

THE MACHINE ATTACK

THE AIM OF STRATEGY IS TO CLINCH A POLITICAL ARGUMENT BY force instead of by words. This is accomplished by battle, the ultimate object of which is not the physical destruction of but instead the mental submission of the enemy. It is important that this should be understood, because destruction is a purely barbaric end, which in the First World War led not only to the defeat of the Central Powers, but also to the annulment of the object of war itself—namely, the establishment of a more generally acceptable peace. The reason for this was that in a mass age it is easier for the majority of people to act like wild beasts than to think like philosophers.

If this true object of war is to be gained, then this destructive mania must cease. This means that, little by little, war must be raised from out the cock-pit of the physical struggle into the sphere of the intellectual and moral struggles. In other words, that more and more must generalship replace brute force, and the moral attack—the attack on nerves—the physical dog-fight, or the attack on bodies.

In the First World War this was impossible, because of the low mobility of the infantry masses and the difficulties connected with their rest and rationing. Now, because of mechanization, it is daily becoming more feasible. Therefore, as mobility increases, we may expect once again to see generalship develop into a high art, battles becoming works of art and not merely daubs of blood.

The form of future battles will in fact be entirely changed by the reintroduction of armour, because by defeating the bullet it exalts the shell. Yet, as a mobile gun is superior to a static, and an armoured mobile gun is still more so, it follows, therefore, that the tank as an offensive weapon is superior to the field gun, which to survive will be compelled to don armour and become self-propelled. Then the contest will become one of tank versus tank.

Also the character of battle will be changed by increased mobility. Because in area warfare the front no longer so completely protects

the rear as in linear, and, as I have pointed out, attacks must, therefore, be expected from all directions, it follows that power to surprise will be increased, and that in consequence the moral attack will frequently dominate the field, its aim being to disorganize through demoralization rather than through destruction.

The connecting link between mobility and fighting power is ground. Therefore, as area-tactics gain in importance, more and more will it become necessary to fit weapons to ground. As the two main fighting arms still remain tanks and infantry, it follows that a prospective battlefield should be examined from the points of view of their respective powers and limitations, and in consequence be divided into tank and infantry (*i.e.* non-tank) areas.

This also means that the theory of the attack must be based on ground with reference to offensive action and protective power, as well as on the time it will take both sides to move over it. Therefore, correct timing of movements will become an exceedingly important consideration; consequently, orders and movements must be simple, because once mechanized arms are launched into an attack, their control becomes difficult. Should ground be unfavourable, or time insufficient wherein to gain a favourable area, one side or other is likely to refuse battle. This, I think, will frequently occur, unless one side has a marked superiority in mobility, or is numerically so superior that it can accept greater risks.

There is yet one other point which battles between mechanized forces will accentuate—namely, the increasing value of a powerful reserve, because increased mobility carries with it power to surprise. As one of the great difficulties in such operations will be to gauge the enemy's intentions, unless strong reserves are kept in hand, it will be impossible to meet unexpected situations. Again, the more mobile armies become, the more difficult will they be to control, and, unless reserves are kept in hand, control is liable to be lost, and with it command, an army rapidly dissolving into a leaderless mob.

These points and others should be considered in the plan of battle, which should be based not as in the past foremostly on the development of offensive power from a tactically secure base, but instead on ability to develop rapid and unexpected movements from a well-organized administrative base. Once again I will explain that the reason for this is that, as the aim of a machine attack is firstly to demoralize and only secondly to destroy, sustained and rapid movements are even more important than sustained and heavy blows. As I wrote in *Lectures on F.S.R. III*:

> "In infantry warfare objectives are generally selected with the intention of enhancing the offensive power of one side to the detriment of the other side. In mechanized warfare their

selection will more frequently be governed by the idea of enhancing and reducing mobility, for until superiority in mobility is gained offensive power is of secondary value."

Objectives must not be confused with the decisive point of attack, for they are no more than the rungs on a ladder by means of which decision is attained. The decisive point is, as I have already stated, the rear of an army, for its command is established there, and from there—generally speaking—run its lines of communications to its supply base. Again quoting *Lectures on F.S.R. III*:

"In the past it has been extremely difficult to strike at the enemy's rear without uncovering one's own line of communications; but as mechanized forces possess the power of moving rapidly across country, it is both easier for them to change their communications and to attack their enemy's at short notice. Whereas to-day armies manœuvre to protect their communications, in mechanized warfare it will frequently be necessary to manœuvre communications in order to supply armies and maintain their liberty of action in the field. As it is impossible to manœuvre roads and railways . . . cross-country trains are likely to take their place."

A further consideration is:

"When a mechanized force is used for a decisive attack, it is necessary that the enemy be first held, or that his power of mobility be reduced so that his freedom of movement is restricted. Unless this is done, rear attacks are likely to prove wasteful. In other words, the enemy must first be held, and it is from this holding operation that the rear attack should be developed. From this it will be seen that an army supplied by cross-country trains working in an area of communications will be far more difficult to fix than one depending on rail or road communications; because the decisive point of attack will be flexible; it will not, so to say, occupy a position, but will move within an area.

"There are objectives the gaining of which enhance protection or offensive action, also there are objectives which will enhance and restrict mobility, and among them must be included areas and localities the occupation of which will distract the enemy's attention, and so cause him to look in more than one direction. Distracting attacks are not feints, but operations which force the enemy to change his plan or deplete his reserves; they are what may be called preparatory operations."

Turning now to a few of the more important special considerations, again I will quote from *Lectures on F.S.R. III* :

> "Frontal attacks should whenever possible be avoided and every attempt should be made to occupy such areas and localities the holding of which will compel the enemy to change his plan."
>
> . . . . .
>
> "Audacity founded on sound information and a psychological grasp of the enemy's higher command are the surest foundations of success."
>
> . . . . .
>
> "In every plan weapons must be fitted to the ground as well as distributed according to an idea, because the battle is fought on the ground and not in the imagination. The ground, as it were, is the factor which rationalizes the idea, changing it into a reality."
>
> . . . . .
>
> "To compel an enemy to keep on the move, to sever him from his supply organization, and then to drive him into an area from which he cannot escape, not necessarily because it is enclosed by obstacles, but because his petrol supply is not sufficient for him to do so, are likely to prove more effective methods of waging battle than a head-on attack."

I will now turn to the grand tactical theory of the machine attack and will develop it from that form of attack which during the First World War bullet, shell, spade and wire compelled the contending parties to adopt. Though this will mean entering into an examination of an obsolete form of attack, not only will it provide a background to the armoured attack, but it will make clear the relationship between the two.

To begin with, there are four grand tactical battle operations—namely :

(1) The frontal attack.
(2) The attack by single envelopment.
(3) The attack by double development.
(4) The rear attack.

The object of the first is to penetrate and of the second and third to out-flank, whereas the aim of the fourth is to knock the bottom out of your enemy.

As in practice the fourth is the more difficult, the first three are the normal grand tactical acts. But in the First World War, on

account of the flankless nature of the entrenched fronts, the first alone was possible, yet, as I will show, in actual fact impracticable until the advent of the tank.

Penetration can take three forms, that of single, dual and multiple penetration, or breaking through at one point, two points or a greater number of points simultaneously.

For example, the Battles of Verdun and the Somme were battles of single penetration based on a slow forward infantry advance protected by overwhelming artillery fire. As the attack moved forward the enemy was pressed back and a huge pocket, bulge, or salient was formed in his battle front. The understanding of the nature of these pockets is the key to all these operations. The reasons for their formation were as follows:

(1) That it is necessary to protect the flanks and rear of the attacking force.

(2) That artillery protection on the flanks is limited by the arc of fire of the guns.

(3) That hostile weapon pressure on the flanks tends, as the attackers advance, to round off the attack.

(4) That fear generally tends to induce men to bunch inwards—that is, away from the exposed flank.

(5) That as the centre is more securely protected by and against fire than the flanks, the advance there is more rapid than on the wings of the attack.

(6) That losses invariably tend to concentration towards the axis of the attack.

(7) That as the centre is freer from the enemy's fire than the flanks, its supply is safer and, therefore, more rapid.

(8) That as the advance of the centre is generally along a line running at right angles to the original front, its movements are less complicated than are those on the flanks.

These are the chief reasons, and from them may be established a practical theorem for all battles of penetration, which can be tested by the measurement of actual battle salients—namely, that the flanking angles of a determined attack incline inwards at approximately forty-five degrees. If, therefore, a penetration is to be effected, its eventual depths will bear a close relationship to the width of the original frontage attacked.

The question now arises, how wide should the final frontage be? For if this can be decided on, then the width of the initial frontage to be attacked can be gauged, and a rough estimate of the strength of the forces required to effect a penetration between these two frontages can be calculated.

The controlling factor in this calculation is the final frontage,

which must be sufficiently wide to permit of a large force passing through the centre of the gap unaffected by hostile fire on its flanks. This gap must, therefore, be about fifteen miles in width, and as this width will bear a definite ratio to the initial frontage, the width of the initial frontage may be arrived at by measuring the distance between these two frontages, multiplying it by two and adding this distance to the width of the front to be penetrated. Thus in Diagram 3, if the width of the gap is A B and the distance between it and the base L M is C D, E F will equal A B plus 2 C D; in this case 15 miles plus 2×5 miles—that is, 25 miles, and the defiladed interior cone J H C I K will have a base of 15 miles and a truncated apex of 5 miles free from most projectiles.

If within the area G (A B F E) there are three defensive systems to be penetrated, in all 56 infantry divisions will be required for the

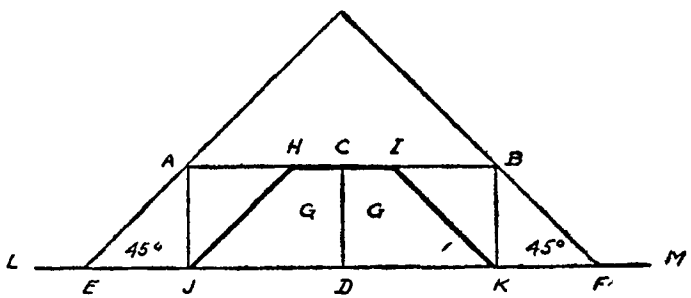


Diagram 3

penetration alone, and to exploit it another 21—that is in all about 1,200,000 men.[1] As the supply of so vast a force in the restricted area obtainable is all but impossible, the result was that during the First World War insufficient forces were assembled, and in turn this led to failure after failure.

The grand tactics of single penetration were followed by those of dual penetration, such as were successfully carried out during 1918.

Remembering what I have written, the following still holds good: If a penetration is to be effected, the salient created by the attack must be sufficiently expansive to prevent concentric fire being brought to bear on its central cone. But in a dual penetration we must add: If penetration is to be effected between the battle salients, then the axes of the two attacks must converge on the mean central line running at right angles to a line joining the centres of the two bases of operations (see Diagrams 4 and 5).

[1] For detail as regards these figures, see my book *On Future War*, chapter iii, "The Tactics of Penetration."

A glance at these diagrams will at once show that an enemy placed at E is more precariously situated than one at F.

Now turning to the attack of dual penetration—that is an attack against two closely related sectors of the enemy's front, *made with a view to break the section which connects them*—in such operations it is advantageous if a salient is chosen as the objective, so that the dual forward movement may be concentric, as in Diagram 4. For an operation of this nature three separate forces are required, as shown in Diagram 6. A attacks at D, not with the aim of penetrat-

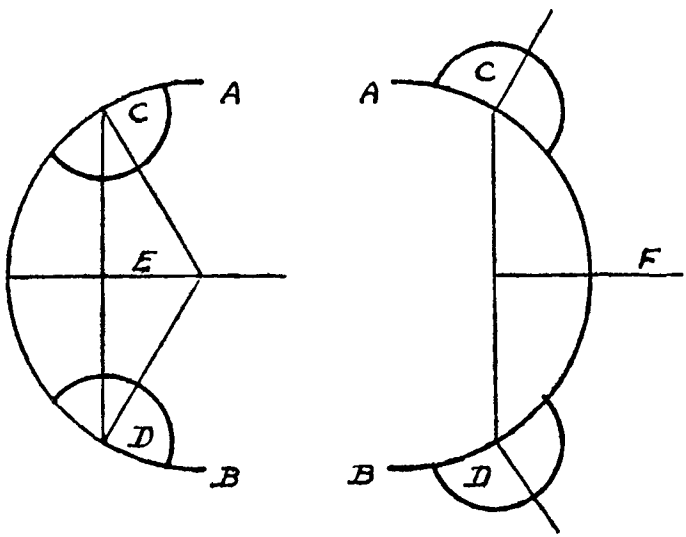


Diagram 4 and 5

ing, but instead of forming a salient which will draw in the enemy's reserves. B attacks at E to do likewise. Meanwhile a tactical penetration is automatically being effected in the area between the salients D and E, not only by the exhaustion of the enemy's reserves detailed to reinforce that sector, but by a squeezing of the sector into so pronounced a salient that concentric fire renders it untenable. The enemy holding it will normally be forced to evacuate it. Thereupon C, following up his withdrawal, will effect a penetration under protection of the two tactical bastions formed by A and B at D and E. These prevent concentric fire being delivered against C's flanks.

So much for the artillery-infantry penetration, at best a most cumbersome and costly affair.

Introduce the tank, when at once one intricacy after the other vanishes. True, new difficulties arise, nevertheless the battle picture is completely changed.

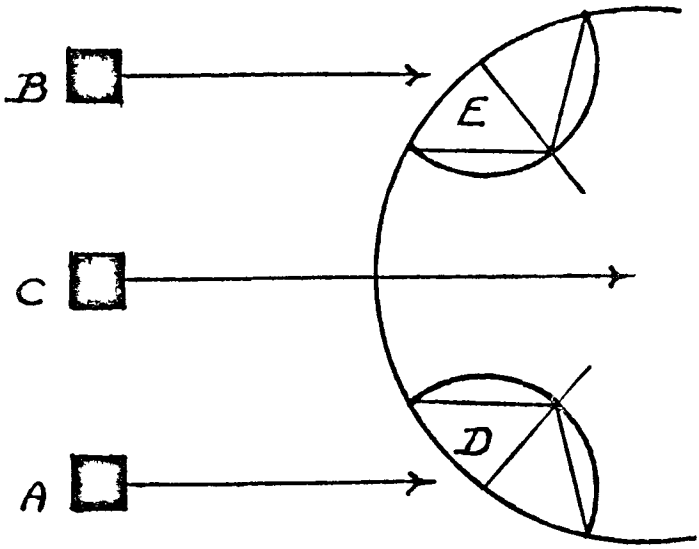


Diagram 6

The reason for this is that the tank is bullet-proof, and because it is so it can face with impunity rifle and machine-gun fire. Therefore, in a tank attack of penetration, instead of the attackers bunching inwards they move outwards, establishing *offensive* instead of *defensive* flanks to the salient formed by the attack. Instead of this salient being a contracting one, it is an expanding one, because the two mobile offensive flanking forces by moving outwards automatic-

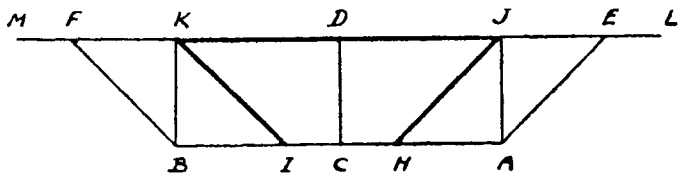
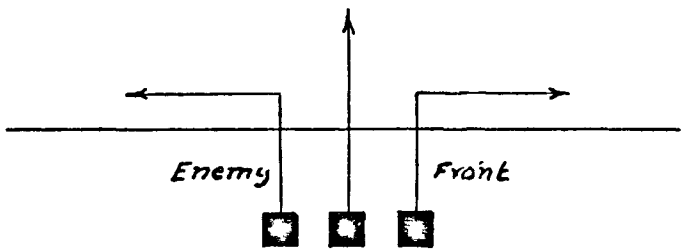


Diagram 7

ally widen its base, which simultaneously carries with it a widening of its prospective truncated apex. In short, as the attack proceeds the situation depicted in Diagram 3 is rapidly inverted to become as shown in Diagram 7. This means that the attackers can start from

a base of fifteen miles and end by punching a gap of twenty-five miles, instead of, as we have seen, the reverse way round. This, in truth, is a most conservative picture, because power to move outwards enables the tanks to advance at right angles to the axis of the attack—that is parallel to their original base as shown in Diagram 8.



Attacking Tanks
Diagram 8

The first time in modern history that this ability to move outwards instead of being pushed inwards was tested out was at the Battle of Cambrai in November, 1917. Yet so little did the British G.H.Q. understand the tactical meaning of armour that an area of attack was selected which as it was bounded by two canals prohibited offensive flanks being formed. Nevertheless, this battle clearly showed, and in spite of the crudity of the machines, that no trench system then existing could withstand a tank attack.

The minor in contradistinction to the major tank tactics of this battle were based entirely on this ability to move outwards as well as forwards. The whole battle front was split up into sectors of penetration, opposite each of which was assembled a group of tanks. What then happened was that the German front was simultaneously

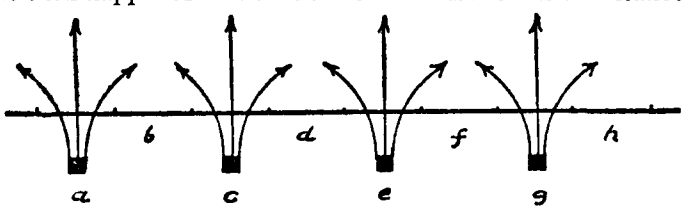


Diagram 9

penetrated at a number of places, the intervening sectors between the points of penetration—which were not attacked—being mopped up by the tanks, which once over the enemy trench turned outwards and advanced parallel to it. This manœuvre is shown in Diagram 9.

Now, if instead of a frontage of some 13,000 yards, as at Cambrai, one of, say, 100 miles is substituted, and if instead of tank companies we think in terms of armoured divisions, tactical theory, though elevated from the minor to the major key, remains identical when an attack of penetration is attempted against a flankless fortified line.

But now introduce two opposing mechanized armies and again the picture changes, for there will be no solid front. Instead, on both sides, groups of machines and groups of infantry moving and halting as groups and not in lines. Therefore, when armoured forces meet armoured forces on a wide front, we find that a return will have to be made to the theory of the dual attack ; because, though no salient may actually exist, the whole front is so fluid that any two simultaneous successful attacks will create one. Thus in Diagram 10, A–B represents the enemy's front not as a line of

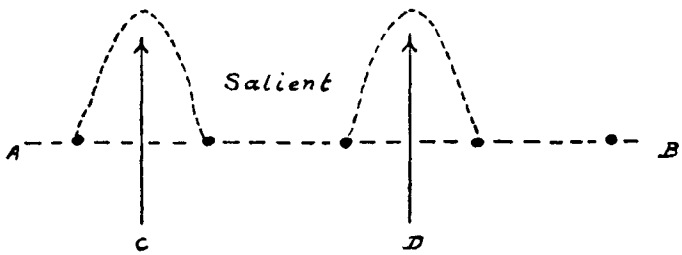


Diagram 10

trenches, but instead as a chain of moving armoured groups. Next, should two determined attacks be made at C and D the frontage between them will be shaped into a salient. And should a number of these attacks be made, a number of salients will be formed, the original chain front being twisted into serpentine form. The point to note is that, whereas in the infantry-artillery attack of penetration the main difficulty was how to get out of a salient, in the armoured attack it is how to place the enemy within one.

Next, the problem becomes one of selecting a salient and cutting it off by driving forward two attacks from E and D (see Diagram 11) not in order to effect a penetration by moving C against the sector in between them, as is depicted in Diagram 6, but in order to cut off all the enemy's troops between E and D, and then, by pressing them on their original front by means of C, completely box them up.

As in the infantry-artillery act of penetration the idea was to create a salient, a protected funnel which would lead to the enemy's rear ; in the armoured it is to annihilate a salient—that is, stop

the gorge of the funnel and so prevent the enemy retiring. Then, instead of pursuit—the form the act of annihilation used to take—we have the clinch or the box up—not an acceleration of speed, but a negation of movement. Everything is, in fact, turned upside down, because the old tactics were built on the bullet, whereas the new are built on armour—the anti-bullet. What the bullet once accomplished, armour now stops; therefore, in the main, what armour does is the exact opposite.

Many years ago now, in 1922, and before I had elaborated this theory of salient-tactics, in my book, *The Reformation of War*, I pictured the tank battle of the next war as follows:

"Rolling forward on its tracks, the war of the future will resemble a conflict of mobile fortresses, followed by moving

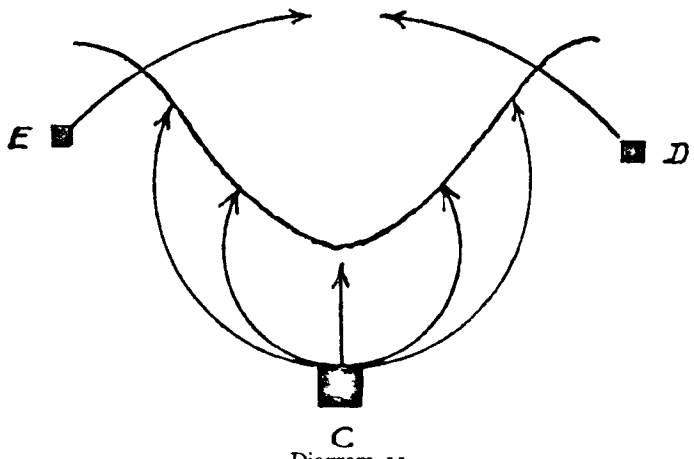


Diagram 11

supply dumps. The skeleton of the battle will be as heretofore; there will be the search, the grip, the clinch and the overthrow, but on this skeleton will be built up muscles of steel. Man will remain the same, a cunning human creature; his means of movement, his weapons and his methods of protection will alone have changed. If mechanically both sides are equal, then on the valour, obedience and self-sacrifice of the soldier will victory depend. But if one side relies on these virtues alone, and neglects to safeguard them by the most powerful weapons obtainable, then will they be of little value, as little as all the valour of the Soudanese was at Omdurman. Moral is the most precious virtue which a soldier can possess, and as we value it so must we protect it.

"In the van of the battle of the future we watch the scout tanks, the light cavalry of the army, retiring . . . falling back on their heavier machines, or away from them to a flank to draw the enemy into a false position. Wireless reports will be sent back from the air fleet and telephoned on from the flag tank to the squadron leaders, who will manœuvre for ground, for position, for light and for wind. Great clouds of smoke will roll over the battlefield, under cover of which mine-laying tanks will move forward to deny to the enemy's machines certain tactical positions, or in the hope that, by a calculated retirement, they may be induced to attempt to advance across them. Destroyer tanks will dart forward to attack the huge artillery machines, the capital ships of the battlefield, and succeed or be driven back by their like. Then at length will the two sides clinch, and amidst the whirl of smoke and gas, the thunder of the guns and the crash of steel, will one human being impose the will of his army on that of his antagonist."

This was considered to be an exaggerated and impossible picture; yet what was exaggerated and impossible was the idea that infantry, cavalry and horse-drawn artillery were going to win the next war.

Chapter XI

THE MACHINE DEFENCE

BECAUSE THE ART OF FIGHTING DEPENDS UPON THE CLOSEST COMbination between defensive and offensive action, victory hinges upon maintaining it and defeat upon inability to do so. Therefore, as I have already more than once pointed out, the surest method of obtaining a decision is to separate the enemy's offensive forces from their defensive base. From this it follows that, whenever offensive action is contemplated, we must first think defensively. This holds good for all operations, because all should have a defensive structure as well as an offensive intent—marches, halts, battles, sieges, pursuits and withdrawals.

The first requirement of both the offensive and the defensive is accurate information, and in machine warfare the ability to discover and collect it has been vastly increased by the aeroplane, the motor car and the motor cycle.

Whereas formerly there were two zones of reconnaissance, an outer strategical and an inner tactical, the first allotted to cavalry and the second to infantry and artillery, in machine warfare there are three: (1) A deep strategical sphere; (2) a less deep tactical zone, and (3) a shallow protective zone. The arms operating in these are respectively, aircraft in the first, motor cars and motor cyclists in the second and tanks and motorized infantry in the third. As regards the second, I wrote in *Lecture on F.S.R. III*:

> "The importance of this sphere can scarcely be exaggerated; for, if I am right in supposing that the motor-guerilla will play an important part in another war, this central sphere will be occupied by a veritable army, a fast-moving swarm which will not only search the area of advance, picket bridges and tactical points, block roads, etc., but will fight off the enemy swarm and so clear the area of advance. . . .
>
> "Within this swarm the army will move and rest, the swarm thinning out in front and thickening on the flanks as the enemy is neared, until, when contact is gained, except for a few patrols, the front will be cleared."

As regards air reconnaissance I wrote:

> "In mechanized warfare the first principle of air reconnaissance is that it should be unceasing. From the moment war is declared air information of the enemy must be gained, and if contact is not to be lost it must be maintained night and day. The call on aircraft will, consequently, be exceedingly severe, and this, until command of the air has been gained, will render persistent attacks on the enemy's cities and centres of industry unlikely, unless at the outset of the war his opponent is vastly stronger than he is.
>
> "In the maintenance of contact, motor guerillas and armoured cars will play a leading part. What the aeroplane discovers these weapons will hold. Thus, should during the daytime an enemy force be signalled from the air as being at *a*, then the object of the motor guerilla and the armoured car will be to swarm round that locality and occupy all approaches and exits, in fact to box the enemy up so that in whatever direction he moves his movement will be discovered—or covered."

Another important duty is the reconnaissance of the ground itself, so that the various arms may be distributed according to their powers and limitations.

Turning from information—the base of defensive action—to the

defensive itself, it may be divided into two types—namely, defensive protection and resistance. Under the first come the various types of guards and under the second the holding of positions.

As regards the first, the old theory of guards was to divide them into three or really four separated bodies of troops—an advanced guard, two flank guards and a rear guard, each under a separate commander and each allotted its particular area of operations. This will now have to be changed, all four duties being allotted to

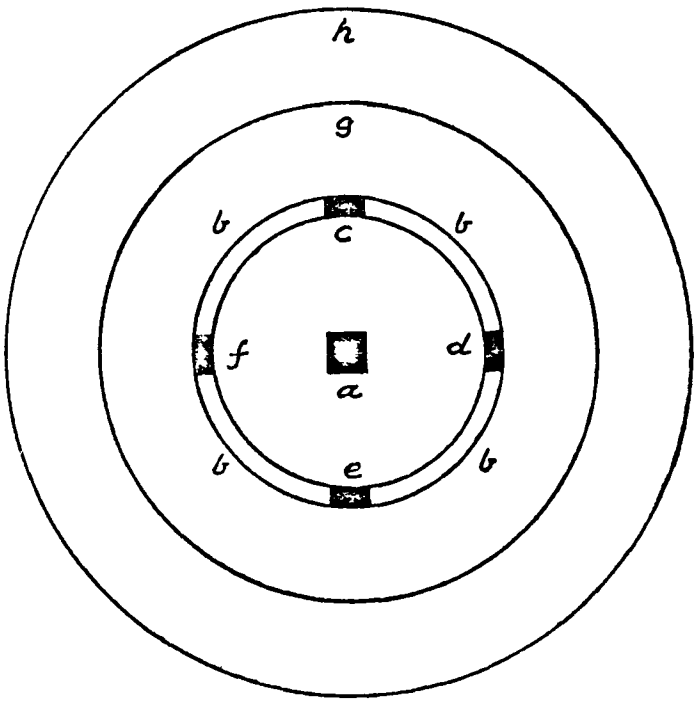


Diagram 12

the protective motor-guerilla swarm, the guards proper forming but strong links within its circumference. As the circle is one, all troops allotted to it should come under one commander, the commanders of the various guards being subordinate to him.

In turn, when the army halts or is at rest, the circle or swarm replaces the outpost line. The general distribution of such a circle is given in Diagram 12, *a* representing the resting army, and *b* the guerilla swarm in which the guards are lettered *c*, *d*, *e* and *f*. From the guards or the swarm, motorized patrols should move out to a

depth of some twenty miles—*g*, and, beyond these, constant aircraft observation should be maintained—*h*. Immediately the air patrols report the position of the enemy, armoured cars or motor guerillas should be sent out to gain contact with him, and to picket all approaches between him and the outpost area. As he advances they should fall back, and as he approaches circle *b*, they should not retire within it, but instead remain out on his flanks, while the guards should make ready to take in flank any enemy forces which attempt to penetrate circle *b*. From this it will be seen that protection at rest is in principle identical to protection when on the move.

Next, turning to the defence proper—that is, the defence of a position or area instead of an army in movement or at rest—the character of defences will depend on their object, whether they are intended (1) to supply a base to offensive action, (2) to stop the enemy absolutely, or (3) to halt him for the time being. As I have already dealt with the first, I will here consider the second and third.

Regarding the second, the position or area should be such that it can only be attacked frontally, and in the third, that when the enemy launches his attack, his rear or flank will be laid open to counter-attack. Once again flank and rear are the points which should guide our decisions and direct our thoughts when we think out our defensive plan.

When a defensive area is chosen to stop an enemy absolutely, or temporarily, a salient or salients should be avoided; but should this be impossible, the following tactics should be resorted to:

First, a zone of defensive works should be constructed across the base (gorge) of the salient, so that, should the enemy penetrate its flank, its defenders will have a line of resistance to withdraw to.

Secondly, defensive works should be thrown up on the flanks of the salient, forming a protective funnel as shown in Diagram 13. These, in the case of armoured formations, should be manned by the anti-tank wings.

Then, when the guerilla swarm, working outside the salient, is compelled to fall back, it should do so on the flanks of the salient, as shown in Figure 2. In Figure 1, the swarm is still out, but is being driven in. In Figure 2, it is shown by the letters a^1 and a^2, whereas b^1 and b^2 are the defended wings of the funnel. The mobile troops should be divided into three groups, c^1, c^2, and c^3, of which c^2 is within the salient, and c^1 and c^3 outside it and on its flanks. Then, should the enemy, *d*, penetrate between b^1 and b^2, c^2 can advance and engage him, while c^1 and c^3 attack him in flank and rear. Should the enemy attack b^1, then c^1 can operate against his right flank, while c^2, or part of that force, operates against his

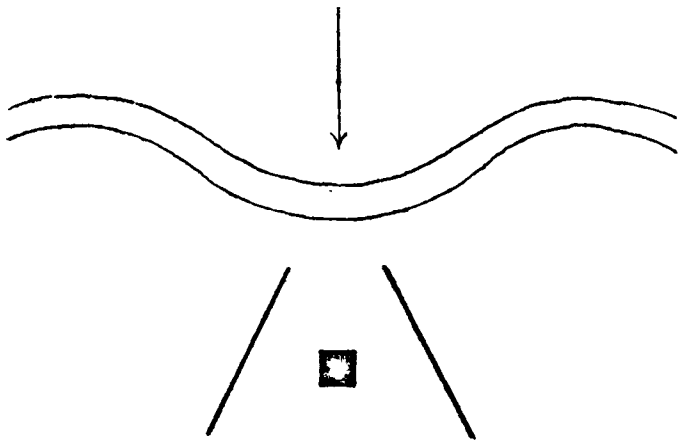


Fig.1

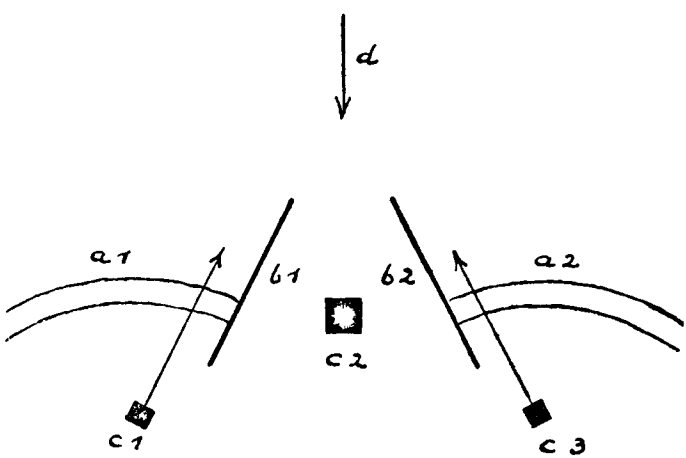


Fig 2

Diagram 13

left flank by advancing up the funnel and moving out of it. The same manœuvre should be carried out if the enemy attacks b^2. The secret of this particular distribution is: (1) it establishes a defensive base from which the mobile forces can operate, and (2) it induces an enemy to offer a flank to counter-attack.

In selecting a defensive area, obviously the ground must be examined in relationship to the object. If to stop the enemy, then its anti-tank possibilities demand first consideration; if to halt him temporarily, then its facilities for eventual tank movement. In the first case a good field of fire should be sought, not only because the enemy's machines can then be engaged at long range, but so that anti-tank works may mutually support each other. When possible, anti-tank obstacles, such as streams or sunken roads, should flank and run immediately in front of the area.

The organization of the defence depends on the natural obstacles to movement existing in it. Vital approaches, rather than vital points, will be the dominating factors. Therefore, before the defender decides on his defences, he should carefully examine his flanks and rear.

The general plan of defence should in every case include a system of anti-tank works and a mobile counter-attacking force, generally kept well in rear and towards the more exposed flank, so that any attempt to turn the works may be attacked in flank or rear.

The more frequent natural obstacles are villages, woods and rivers. Generally speaking, the first are unsuitable localities for tanks to fight in, because movement is restricted to roads and lanes. Woods should be defended by anti-tank machine guns supported by artillery, for though, if of a dense nature, they constitute definite obstacles to tank attack, they frequently form admirable covered approaches and harbours. Should tanks be allotted to support their garrisons, they should be so placed that, when the enemy is held by anti-tank fire, they can attack him in flank.

To all but amphibian machines rivers also form definite obstacles, therefore their importance is likely to grow in defensive warfare. In the main they should be held by anti-tank weapons supported by artillery, and when tanks are allotted to assist in their defence, they should be kept concentrated in such positions as will enable them to counter-attack the enemy directly he has effected a crossing. They should not be split up into small packets to watch bridges, fords, etc. When such have to be defended anti-tank weapons should be used.

In my *Lectures on F.S.R. III* I pointed out that each defensive area:

"should be sub-divided into mobile and static tactical sectors ; the second canalizing the attacker, and so leading him into areas where he can be readily counter-attacked by tanks. Here is presented to us a somewhat novel conception of the defence—namely, that a counter-attack is not necessarily an attack on an enemy who has broken through a defensive system, but instead has been shepherded by the defences into areas where he can be attacked with advantage."

With reference to this, the anti-tank weapons should be so sited that their fire will drive the attacking tanks on to the defending artillery. In turn, the guns should be so sited that they will drive them into those areas selected for counter-attack, and, finally, the counter-attacking tanks should be so placed that they can drive the enemy's tanks on to a concealed minefield. Here we have presented to us a picture of the closest co-operation between the various defensive and offensive arms, and this picture must be present in the defender's mind at the time he decides upon his defensive arrangements.

To turn now to the counter-offensive. Should the frontier of the defender nation be protected by a zone of anti-tank works, then everything is to be gained by inducing the enemy to attempt to penetrate. Similarly in field warfare, as an armoured formation will consist of two forces—tank and anti-tank—whenever it is possible for the commander so to place the anti-tank wing that the enemy will have to attack it in order to carry out his plan, then it will generally be to the advantage of that commander to let him do so, and directly his attack begins to succeed or fail, to launch a counter-offensive in full force against him.

The whole question of the counter-offensive is one of common sense, and also one which will bulk large in machine warfare. If you can persuade your adversary to blunt his sword against your shield, indirectly your own sword is sharpened. In this respect we may talk of an offensive counter-offensive—namely, an advance to engage the enemy, a withdrawal to persuade him to advance against anti-tank defences, and then once more a forward movement to strike him before he can reorganize. Such was William the Conqueror's plan at the battle of Hastings.

Thus far, what may be called mobile defence. From it I will now turn to static or protracted defence as occurred during the greater part of the First World War, because there can be little doubt that, as time moves on, mobile warfare will gradually beget its opposite. Yet there will be this difference : whereas in 1914–1918 entrenched line held entrenched line, in the future the probabilities are that instead fortified zone will hold fortified zone.

These zones will bear little or no resemblance to the Maginot Line, which is a mere wall or narrow belt of fortifications. Instead they may possess a depth of one hundred miles, possibly much more, therefore it is out of the question to attempt to cover them with a network of anti-tank and other defences. Instead, each zone should be divided into two sub-zones, which I will call *A* and *B*. *A* will consist of a belt of works bordering the frontier, and *B* of the remainder of the entire zone. *A* may be compared to coastal fortresses, and *B* to the old medieval castles which blocked inland approaches; for in it all strategical centres, such as railway junctions, industrial towns, aerodromes and the capital will be fortified. Should zone *A* be penetrated, then, though the invader will not be confronted by belts of works, his movements will be restricted by these anti-tank and anti-air castles. Not only will they form harbours of refuge for his opponent, but in most cases he will be compelled to reduce them before moving forwards, because to pass them by will lay his area of communications open to constant attacks.

In short, the protracted defence in machine warfare is brought about not by blocking the enemy's advances, but by entangling his forces in a tactical net of fine mesh from which, should he break through it, he will find himself caught in a strategical net of wider mesh. This system of defence is very similar to those laid down by the Byzantine Emperors Maurice and Leo the Wise in their manuals, the *Strategicon of* 579 and the *Tactica* of 900. The entire realm was divided into Themes, or army corps districts, each protected by a number of well-sited fortresses linked together by good roads, and garrisoned by highly mobile troops. This system successfully protected the Eastern Empire for eight and a half centuries.

Chapter XII

THE PROBLEM OF INVASION

THROUGHOUT HISTORY A SEA INVASION HAS ALWAYS BEEN WHAT may be called a limited operation of war, because of the simple and obvious fact that man is not a water creature. Here, again, though to a far lesser extent than in air warfare, gravity is his enemy. On land, by means of the wheel—a section of a rolling log—he enters into alliance with gravity, for this great invention

reduces friction with the surface of the ground; but on water he has to fight against gravity, and does so by elaborating a branch or a trunk of a fallen tree into a raft or canoe, on which he gains support or rests himself in his progress through the water. A hollowed log is the beginning of the *Queen Elizabeth*, and a branch used as a paddle of the engines of the *Renown*.

Throughout, the limiting factor is buoyancy—the relationship between the "weight" of man and the "lightness" of the log, and when it is translated into terms of invasion, it becomes an equation between shipping tonnage and troops to be carried. Though from one angle this limitation has steadily been reduced by the building of larger ships, from the other it has been steadily increased by the raising of larger armies and above all by the growing complexities of their impedimenta.

The next great limiting factor in an invasion is a tactical one, connected not with means of movement but instead with protective and offensive power. Since soldiers have ceased to be ship-fighters, as they were in the days of galley warfare, when at sea they are now to all intents and purposes non-combatants. This limitation reaches its apex during disembarkation—that is the short interval of space and time between leaving the transports and gaining the shore. It is this interval which, on account of the increase in fire power, has become the crucial tactical problem of invasion. But before I attempt to solve it, it is, I think, as well to paint in its background.

Going back a long way in the history of overseas invasions, we find that in the days of Julius Cæsar, whether opposition was to be expected or not, the number of suitable landing beaches was strictly limited, not only by the nature of the shore, but also by the nature of the land bordering it. Later on, when infantry gave way to cavalry as the superior arm of attack, the difficulties incumbent in the transportation and landing of horses precisely governed the size of an invading force. For instance, when, in 1066, William of Normandy decided to invade England, his crucial problem was the shipping of horses. Though the chroniclers, no doubt in order to magnify his exploit, inform us that he brought with him an army of 60,000 strong, the probabilities are that it numbered no more than a tenth of that figure. Even if the 696 open boats which William is reported to have built is accepted, his total force cannot possibly have been more than 13,000 men and 2,000 horses, which in the eleventh century would have represented an enormous army. The probabilities are that it was about half that size—to-day a somewhat large mixed brigade.

This difficulty of transportation grew with the growth of military organization and equipment, and this is the hidden reason why,

though since 1066 Great Britain has been engaged in many continental wars, yet from that date onwards only one serious attempt has been made to invade her shores—namely in 1588. This fact alone clearly shows how seldom do conditions favour an overseas invasion of a country in which the would-be invader has no previous footing.

Turning now to modern times, the whole picture becomes vastly complex. Not only has surprise been restricted by the impossibility of hiding the assembly of a large invading army, but the complexity of that force itself has limited the landing places to well-equipped ports, because if opposition is to be expected, landing on an open beach is no longer a practical operation until landing stages, wharfs, quays, etc., are built. The last time this was attempted, and then only by a medium-sized invading force, was in the Gallipoli adventure of 1915, and though it is only fair to mention that from start to finish that particular invasion was bungled, the fact remains that it conclusively shows the extreme difficulty of landing even in the face of weak opposition. The most dramatic example of this was the landing at Suvla Bay, for though throughout that operation British generalship was virtually non-existent, careful arrangements had been made, nevertheless 1,500 Turkish troops, led by an exceptionally able German—Major Willmer—for several days on end completely bunkered 25,000 British soldiers. This is what took place—I quote from Chapter xxvi of my *Decisive Battles*:

> "At 9.30 p.m. the 23rd and 33rd Brigades of the 11th Division . . . in pitch darkness approached 'B' beach to find it undefended. By 10 p.m. four battalions landed without a man being killed; yet dog-tired, for the men had been on their feet for seventeen hours. Lala Baba was occupied and the way opened to the capture of Hill 10; but no one knowing exactly where it was, nothing was done. Meanwhile the 34th Brigade . . . entered Suvla Bay; but as the lighters headed for 'A' beach, when fifty feet from the shore they struck a reef, which so delayed the landing that dawn broke before the men could disembark. To make matters worse, the 10th Division . . . which should have landed on 'A' beach in order to occupy Kiretch Tepe, was in part disembarked on 'C' beach and on a new one discovered north of 'A.' Thus its organization was broken up, when complete confusion set in.
>
> "Orders and counter-orders now followed each other in rapid succession, while the Turkish sharpshooters . . . picked off the invaders by scores, and thus the situation remained from hour to hour. Not until daylight was fading did an attack on

Chocolate Hill begin to develop, and as darkness set in it was carried as well as the eastern half of Green Hill. Meanwhile on the left little was done outside gaining a foothold on Kiretch Tepe. All the encircling hills remained in Turkish hands, yet more than half the 9th Corps, twenty-two battalions in all, had not been engaged; nevertheless, those which had had lost 100 officers and 1,600 men, 'or rather more than the total strength of the Turks arrayed against them.' "

It may be objected that these blunders are unlikely ever to be repeated and that therefore the Suvla Bay invasion is not a good case to quote.

The history of overseas invasions in no way bears this out, if only for two reasons. The first is that, when opposition is likely to be met with, night offers the only practical period during which a surprise landing can take place. The second is that, except by air, reconnaissances of a defended beach or port are impossible, and that, in consequence, the invader is doubly blind. In short, no operation of war is so difficult and problematical as a night landing on a defended beach or at a defended harbour. Should, however, they be unoccupied by the enemy, as they were in 1904 when the Japanese first landed in Korea, then time—velocity of landing—and not the bullet and shell—velocity of offensive power—is the deciding factor.

This introduces the velocity machines—the aeroplane, the tank and the motor vehicle, all three of which have drastically, if not radically, modified the problem of invasion, and to the disadvantage of the invader.

First, it is obvious that in all major wars an invading army must be motorized. To land a muscle-moved army is, therefore, out of the question. Therefore not only is the problem of transportation complicated by the numbers of war machines and vehicles which will have to be shipped, but the disembarkation difficulties will be enormously multiplied, so much so that the landing of heavy guns, tanks, vehicles and engineer stores on an open beach is no longer a practical operation of war. Ports, and well-equipped ones at that, must first be seized and their seizure will occupy time.

Secondly, it is equally obvious that should, let us suppose, twenty possible landing ports exist, motorized as the defender's forces will be, it is quite unnecessary for him to split them up into twenty packets. Instead, he can distribute the whole within his territory, and directly news of invasion is received rapidly concentrate them against the threatened points. For example, were the English to invade France, and were the French mechanized and

motorized forces concentrated at Bourges, the following ports can be reached from within forty-eight to seventy-two hours:

Dieppe, Havre, St. Nazaire and Bordeaux in 48 hours.
Dunkirk, Calais, Boulogne, Marseilles and Toulon in 60 hours.
Brest and Lorient in 72 hours.

What will the invading English accomplish in so short a time—one-tenth of what it would have taken Napoleon's troops to march? Will they in these forty-eight to seventy-two hours be able to occupy a port or ports, land and deploy a force even one-tenth or one twentieth the size of that the enemy can concentrate? No! For invasion has anyhow for the time being been reduced to a position of absurdity, and certainly so should the point of landing be situated outside of the range of the invaders' land-based fighting aircraft.

To make the difficulties clear, and they are not sufficiently understood by civilian strategists, I will run through the main points which will have to be considered before an invasion can be attempted.

Shipping. Assuming that an invading army is 500,000 strong, though the amount of shipping it will require will depend on its destination, yet the tonnage required to transport it will total about two and a half million, probably much more.

Embarkation. As it is imperative that embarkation should be as rapid as possible, only fully equipped ports can be used, and as these are limited in numbers, their whereabouts will be known to the enemy; therefore, unless they are strongly protected against air attack, heavy losses must be expected. Supposing, however, that the enemy's aircraft are kept at bay, at least twenty convoys of twenty transports each will be required to carry the expedition overseas. Therefore, for weeks on end a constant stream of ships will, like a shuttle, be moving outwards and homewards. Further, each convoy will have to be strongly escorted, and the larger each is the more difficult will be its protection.

Disembarkation. Here the invader is not only faced by enemy air attack, but also by opposition on the ground, and in consequence he may expect all the difficulties the British experienced in Gallipoli multiplied several times. Further, should the points of disembarkation—which must also be fully equipped ports—be located outside the range of the invaders' land-based fighter planes, he must expect very heavy if not catastrophic losses. And should they be within them, then they will be restricted in number and in consequence foreseen by the enemy. Therefore, should such be selected, strong land opposition must be anticipated.

Bridgeheads. To mitigate this, it will be necessary to clear the ground for the invasion by a series of advanced guard operations—

preliminary invasions—the object of which will be not only to seize and hold well-equipped ports, but also suitable airfields in their vicinity. In other words, to establish bridgeheads for the invading forces to land at, and what is most important is in an exceedingly brief space of time—at most seventy-two hours in the above case of France.

Debouching. Supposing that this is successfully undertaken and that a series of ports and points along the enemy's coastline has been seized, and so strongly fortified that these points can resist assault, then the next problem is one of debouching from them, and of deploying into order of battle. Is this a possible operation of war? Certainly, should the enemy offer no opposition; yet, should he do so, what is to be expected? As he is unable to assault these advanced guard positions, he will forthwith invest them, and, by strongly entrenching his own position, compel their garrisons—the now disembarked invaders—to carry out the most difficult and costly operation of war—namely, an eccentric frontal attack on a fortified position.

Bearing these difficulties in mind, and they could easily be added to—the vast numbers of transports required; the extensive naval forces needed to protect them; the security of the ports of embarkation and disembarkation against air attack; the establishment of defended bridgeheads; the gaining of local command of the air, and the formidable difficulty of deployment—I do not believe that an invasion on the grand scale against a determined enemy in a well-roaded country is any longer a practical operation of war, unless the would-be invader can base his forces on the country of an ally or on a locality so far distant from his enemy that he cannot be interfered with for days and even weeks on end.

Ten years ago now I referred to this subject as follows in *Lectures on F.S.R. III*:

> "In recent years overseas expeditions have become increasingly difficult, so much so that to-day they are almost impracticable against a well-equipped enemy, because he can within a few hours of a hostile fleet being signalled concentrate by motor vehicles considerable forces against any threatened point on his shore line. Few of such points are likely to exist, as a modern army cannot disembark on any stretch of beach; in fact, it is extremely doubtful whether a present-day army with its immense impedimenta of supply columns, hospitals and workshops, a veritable travelling city, can disembark anywhere outside a well-furnished port. To effect a surprise landing is not only difficult but almost impossible, and without surprise

a disembarkation becomes in nine cases out of ten a suicidal undertaking."

I then went on to point out how mechanization, if rightly tackled, offered a possible solution to this problem, basing my suggestions on experiences gained during the First World War.

Strange though it may seem, in 1916 and before British tanks had taken the field in France, a project was considered to use tanks in a landing operation on the Flanders coast. Though it came to nothing, it was revived during the following year, when extensive preparations were put in hand to carry it out. This operation was to coincide with the British attack at Ypres directly Roulers was occupied, when tanks were to be landed between Nieuport and Ostend. As Roulers was never taken, this scheme was abandoned; nevertheless its preparations are still of interest.

Between the points selected for the landing the water was shallow, the beach was wired and flanked by a sloping sea-wall some twenty feet high, capped with a heavy projecting coping-stone. Beyond this wall were the German guns and machine-guns in great strength, and still further inland innumerable dykes and canals. This, then, was what the Mark IV tank—a crude machine weighing nearly thirty tons—was asked to do: To land from the sea, climb the sea-wall at a slope of a little less than one over two, climb over the coping-stone which projected two feet outwards from the wall, destroy the enemy's machine-guns, and then, by turning itself into a power station, haul up guns, lorries, tractors and scores of tons of ammunition and supplies. The initial landing was to take four minutes!

In order to effect this, pontoons some 600 feet long, carrying tanks, troops, guns, vehicles and stores, were to be pushed by two monitors towards the beach. Once grounded, the leading tanks, each equipped with a ramp fixed to its nose, were to crawl off their pontoons and then up the sea-wall. Directly the forward end of the ramps struck the coping-stone they became detached, when the tanks, which had wooden spuds fitted to their tracks, walked up the ramps like a mountain railway locomotive, the cogged track engaging a ratchet fitted on the ramps. It was a clever scheme and the first of its kind.

This problem, like all landing problems, centred round how best to span the interval between ship and shore; therefore it was obvious that were a floating tank built, most of the above-mentioned paraphernalia could be dispensed with. Consequently, towards the end of the war, when the Allied Powers were faced with the probability of having to cross the Rhine, this simplification was tackled by myself and others. As from calculations it was known

that a hermetically-sealed tank of 36 tons would just float with its roof flush with the surface of the water, the method adopted was as follows: The engine having been rendered water-proof, two large caissons were lashed to the sides of the tank, which gave it sufficient buoyancy to be warped over a river. On arriving at the far bank, the caissons were unlashed and the tank took to the shore. Though this method was primitive it was effective, and in October, 1918, I crossed over the Brent Reservoir (the Welsh Harp) in the first tank which ever floated.

The war at an end, experimental work in water-crossing was continued, because I was of opinion that, as all our overseas expeditions must in their initial stage take the form of landings, a true amphibian tank would prove invaluable. This resulted in the construction of an experimental floating machine which required no caissons. In 1921 it propelled itself by means of its tracks across Fleet Pond; then came economy and it was abandoned.

Before this foolishness put an end to the water-crossing machine, I accentuated its importance in a lecture given at the Royal United Services Institution in February, 1920, in which I said:

> "Let us all, this time, get into our astral shells, for this is a naval as well as a military question. We see a stretch of weary sand—it is the Baltic coast. We see curious ships racing through the Skagerrak. They are now standing out a mile or more from the shore, for the water is shallow. There is a rumbling sound, then from their prows squat objects splash into the water—they are moving rapidly towards the beach; from the water they crawl on to the sands; they are tanks and Warnemunde, 150 miles from Berlin, is ours. . . .
>
> "From the surface tank-carrier the next step is the submarine tank-carrier—a kind of sea-serpent which spews monsters on to the beach. What would Olaus Magnus think of this, he who wrote of sea-serpents fashioned of skin and blood? Think now what such possibilities mean to us islanders. No longer will our sailors belong to the Great Silent Fleet, but to a fleet which belches war on every strand, which vomits forth armies as never did the horse of Troy, and which will swallow them up again if the land appears unpropitious and carry them safely home beneath the ocean. Think of the naval bases seized and the landing places protected. Think of the channel which separates us from Europe. It has been called a 'ditch'—it may become a veritable tube railway for hostile armies."

In 1931 Messrs. Vickers-Armstrong designed and put on the market a light amphibian tank fitted with a small propeller, and

had the problem of the water-crossing machine been then taken up and pushed with a little enthusiasm, I see no reason why to-day far more powerful and efficient machines should not exist, machines which on a calm day could cross the English Channel. The vision of a fleet of tanks based on the Kent and Sussex coasts and operating in France or Belgium without first having to be transported by ship is by no means a fantastic one.

There are three operations in which amphibian tanks are likely at some future date to be used: (1) in river crossings; (2) in coastal raids, and (3) in seizing and occupying bridgeheads in order to facilitate an overseas invasion. In the second the aims would be: (1) to create panic; (2) to compel an enemy to disperse his forces, and (3) to destroy objectives of military value.

When distances are too great for amphibian machines to cross water under their own power, then they should be transported in ships specially designed for their carriage, as I mentioned in *Lectures on F.S. R. III.*

> "If landings are to be made rapidly with amphibian tanks, these machines should be embarked upon specially constructed tank-carrying ships, built on somewhat similar lines to large steam whaling vessels. Instead of hauling whales in and out of the ships, tanks under their own power will crawl out and into them. The ship will in fact be nothing more than a mobile tank-roost."

Another type of invasion which offers many possibilities if jointly taking place with amphibian tanks, is that of air-borne troops. A long time ago now the evacuation of several hundreds of people from Kabul by air should have fired military imagination. It did not, except in Russia, where experiments on a large scale were carried out with parachute troops, and in Germany which is the true fatherland of the glider.

It was, however, more as a transporter of supplies than of fighting men that between 1919 and 1939 aircraft appeared to point the way, and more particularly so in the Italo-Abyssinian War. During the advance on Dessié in April, 1936, and for the first eight days of its occupation by the Italians, Marshal Badoglio informs us that "ration supplies were brought almost entirely by air," aeroplanes "dropping as much as 25 tons weight of rations daily." Though this may seem an insignificant amount, I believe I am right in saying that throughout this campaign in all several thousand tons were dropped, which certainly pointed to the likelihood that, in both future land and sea invasions, mechanized forces will on occasion be supplied entirely by aircraft.

PART III

MACHINE WARFARE IN PRACTICE

"War is father of all and king of all; and some he made gods and some men, some slaves and some free."
—*Herakleitos.*

Chapter XIII

CONTINENTAL v. OCEANIC POWER

THE WAR AT PRESENT RAGING, WHICH THUS FAR HAS BEEN NAMED the Second World War, is not only the military expression of the Machine Age, but also a clash between two contrary philosophies of what politically and economically such an age demands. On the one hand stand the Oceanic Powers and on the other the Continental, of whom, on the outbreak of the conflict, the leading representatives were Great Britain and the U.S.A. on the one hand and Germany and the U.S.S.R. on the other. In between came the remaining nations, varying from nondescript to semi-oceanic and semi-continental.

The political mechanism of the first—the Oceanic—was based on finance; of the second—the Continental—on labour. The former looked upon the world as a money-making machine, the latter as a power-producing plant. Their respective politics revolved round a division of the nations into trade markets, and an assemblage of them into an autarchic system; because political separation fosters international trade, and economic unification the power of the dominant nation in the union.

Politically, the two groups were diametrically opposed, because to the Oceanic conception of power as money the autarchic system spelt death, and to the Continental full power was unattainable so

long as economic divisions endured. The war, therefore, was inevitable unless one system or the other preferred suicide. In fact it was pre-ordained, because it was no more and no less than the continuation of the struggle which had been set in motion by the Industrial Revolution, during which the first clash was that of the Napoleonic Wars.

It is of importance to realize this, because otherwise the whole meaning of the present war is lost, and in consequence also the meaning of the peace which should be winnowed from it. A peace which for its day will decide whether the machine in form of power or money shall continue to rule mankind, or whether man shall master the machine and in consequence both money and power. If the former, then this war will inevitably be followed by another, and so on until man once again regains his cultural liberty. If the latter, then in spite of the waste and misery now trailing in its wake, one day it will be looked upon as a war of liberation in which the positive and negative currents of the same mechanistic civilization cancelled each other out, so that culture—the soul of civilization—might be freed from the mastership of the machine. Consequently it may be a war which will liquidate the epoch which emerged from out of the Renaissance, the Discovery of the New World, and the Reformation.

In my book, *Decisive Battles, their Influence upon History and Civilization,* I divided war into three epochs, of which the second and third were called "The Columbian or Oceanic" and "The Napoleonic or Continental." And though I left history to describe itself, I pointed out that the third was the reaction created by the second, the recoil, as it were, which growing stronger and stronger would in the end inevitably eat the second up. Then, in turn, by its very victory, it would establish within itself its own recoil—its destiny—which as the ages passed by would one day cancel it out. Such, I believe, is the rhythm of human affairs, the predestined course of the destinies of man's political efforts.

Here I have no intention of elaborating this philosophy. Instead, all I have in mind is to clarify the present struggle by briefly setting down what Napoleon had in mind, and, then, leave it to the reader to decide whether or not the Hitlerian conception of *Lebensraum* is or is not closely related to it. I consider this essential, if only because as war is no more than a continuation of peace policy by other means, and as the military conceptions of to-day emerged from out of the Napoleonic Wars, unless the Napoleonic politics and economics are understood, the relationship between the present war and the present political and economic systems which gave it birth must remain obscure. Be it remembered that the war now in progress is, like every other great war ever fought, an economic and

political and not merely a military event. Therefore, above all, it is a contest of ideas and not a mere shower of blows.

Let us turn, then, to Napoleon's ideas. He studied English politics and economics and saw that conditions in England were so different from those prevailing in France that, were the English political and economic systems applied to his own country, nothing but chaos would result. As regards government, he said to Gourgaud: "A deliberative assembly is a terrible thing. The English constitution suits England only." And as regards economics, his ideas were those of Rousseau, according to whom: "The perfect state . . . was one that sufficed for all its needs and could do without foreign trade. The ideal commonwealth was 'that which can subsist without other nations, and without which other nations can subsist.'" In accordance with this idea, in September, 1793, the Convention excluded all goods not carried in French bottoms, and, in October, an embargo was placed upon all British merchandise. It was this system which Napoleon, the true instrument of the Revolution, adopted. He believed in the sanctity of private property, also that a self-sufficient nation was more contented than one which was not. That toil produced a hard and healthy people, whereas trade a soft and crafty. Above all, he believed that the despotism of gold could only lead to economic slavery. Coming from a poor and peasant country, he feared debt and despised wealth. He said: "I have a taste for founding, and not for possessing."

He explained his economic system to Las Cases and to Montholon as follows:

> "1st. Agriculture is the soul, the foundation of all national prosperity.
>
> "2nd. Industry—the comfort and prosperity of the people.
>
> "3rd. Internal trade—the profitable employment of the products of agriculture and industry.
>
> "4th. Foreign trade—the profitable employment of the surplus of the national products, the superabundance of property, but of much inferior interest to the others, to which it is subservient, and not they to it."

With this policy in mind, he studied English finance, and to him it was synonymous with usury. To him interest on foreign investments was no other than the toll paid by a conquered people, a people reduced to financial serfdom. He would have nothing to do with loans, therefore the clash with England was inevitable. "It was money," writes McNair Wilson in his *Mind of Napoleon*, "organized as a world power, that he meant to fight, and, if possible, destroy. Since Money had its headquarters . . . in the City of London

his attack was directed chiefly against that city and its bankers. The object was not the conquest of England, but the ruin of Lombard Street."

But how to get at England?—that was his problem. Therefore the mastery of the sea, as he said himself, was "the principal and constant aim of my policy." In the end he lost, for the sea defeated the land; yet, had he been victorious, this is what he said he would have done:

> "Had I maintained my power, I would have changed the course of trade, and the direction of industry. I had naturalized sugar and indigo in France, and I should have naturalized cotton, and many other articles of foreign produce. I should have knocked up the colonies, if we had continued to be denied a share of them.
>
> "With us the impulse was most powerful. National prosperity and science advanced beyond measure. Yet your [he was talking to Colonel Wilks in St. Helena] Ministers proclaimed through all Europe that the French were overwhelmed with misery, and were retrograding to a state of barbarism. . . .
>
> "Had I been allowed sufficient time, there would soon have been no such thing as trades in France, they would all have been converted into arts. . . .
>
> "England and France held in their hands the fate of the world; and particularly that of European civilization. What injury did we not do each other! . . . What good might we not have done! Under Pitt's system we desolated the world. . . . With Fox's system, we should have understood each other . . . we should have accomplished and preserved the emancipation of nations, the dominion of principles. Europe would have presented but a single fleet, and a single army. We might have ruled the world. We might everywhere have established peace and prosperity, either by dint of force or persuasion. . . . Yes, I repeat, what mischief have we not done! What good might we not have effected!"

Whether this would have been so or not, history has decided we shall never know. Yet there can be no doubt that, from start to finish, Napoleon's central idea was the resuscitation of the Empire of the Cæsars or anyhow that of Charlemagne under the leadership of France. This idea carried with it the destruction of the British Empire, which oceanically was absorbing Rome's old terrestrial destiny.

What this tremendous age which centred round Napoleon accomplished is only to-day becoming apparent. But first and

foremostly was hatched from out its chrysalis a new faith called "Nationalism." Yet he seems to have seen that nationalism in itself is suicidal, unless nations are bound together by a universalism hinged upon so strong a central authority that it can restrict international strife. Believing in individual rights, private property and public duties Napoleon was a true democrat. As Carlyle writes:

> "The man was the Divine Missionary, though unconscious of it; and preached through the cannon's throat, that great doctrine, '*La carrière ouverte aux talens*' (The tools to him who can handle them), which is our ultimate Political Evangel, wherein alone can Liberty lie . . . call him, if you will, an American Backwoodsman, who had to fell impenetrated forests, and battle with innumerable wolves, and did not entirely forbear strong liquor, rioting and even theft; whom, notwithstanding, the peaceful Sower will follow, and, as he cuts the boundless harvest, bless."

This is true, because Napoleon was the prophet of a universal idea. For instance, he intended to intermarry the new blood with the old, so as to create a new nobility. Further, "he had designed," writes Professor Fisher, "in the Institute of Meudon, a school in which all the princes of the Imperial House would have received a common education," so that "the rulers of Europe be more likely to keep the peace."

Like Alexander the Great, Napoleon dreamt a dream, a vision of a world-to-be, which in his day lay far beyond the margins of realization. This dream may be defined as "Unity through Federation," the foundations of which he described to O'Meara as follows:

> "The system of government must be adapted to the spirit of the nation and to circumstances. In the first place France required a strong government. While I was at the head of it, I may say that France was in the same condition as Rome, when a dictator was declared necessary for the salvation of the republic. . . . One of my grand objects was to render education accessible to everybody. . . . My *canaille* would have become the best educated in the world. All my exertions were directed to illuminate the mass of the nation instead of brutalifying them by ignorance and superstition. . . . Those English who are lovers of liberty will one day lament with tears having gained the battle of Waterloo. It was as fatal to the liberties of Europe as that of Philippi was to those of Rome."

With France as the powerhouse of his system, his "grand objects" were: To re-establish the Kingdom of Poland as a barrier against "the barbarians of the north." To liberate Spain from superstition and to give her a constitution. To form independent republics in England and Ireland. To unite all Italy, Naples and Sicily in one kingdom. To declare Hungary independent and to liberate Greece. To subdivide Austria, break up Prussia, gain control of Egypt and cut a canal through the isthmus of Suez, partition Turkey, driving the Turks out of Europe, and "bridle the Muscovite barbarians" —the one great threat to Europe—so as to accomplish, as Professor Fisher writes, "a work analogous to that of Leo I and Charles Martel, of Charlemagne and Otto I, who saved the fabric of Greek and Latin civilization from destruction at barbarian hands."

Lastly, to federate the whole. "I wish to bring about," he said, "the amalgamation of the great European interests in the same manner as I had effected the union of parties in France." Quoting Las Cases, Professor W. Alison Phillips writes:

> "He had aimed, he said, at concentrating the great European peoples, divided hitherto by a multiplicity of artificial boundaries, into homogeneous nations, out of which he would have formed a confederation bound together 'by unity of codes, opinions, feelings and interests.' At the head of this league, under the aegis of his Empire, he had dreamed of establishing a central assembly, modelled on the American Congress or the Amphictyonic assembly of Greece, to watch over the common weal of 'the great European family.' The dream had been dissipated by his ruin; but he prophesied that it would yet be realized, sooner or later, 'by the force of circumstances.'
>
> "'The impulse has been given, and I do not think that, after my fall and the disappearance of my system, there will be any other great equilibrium possible in Europe than the concentration and confederation of the great peoples. The first sovereign who, in the midst of the first great struggle, shall embrace in good faith the cause of the people, will find himself at the head of all Europe, and will be able to accomplish whatever he wishes.'"

This federation was to be attained through a common economic system divorced from loans. In other words, it was to be anti-capitalistic, and because England was in his day the champion of loan-capitalism, he had fought her. To Caulincourt he said, in December, 1812, when travelling by sledge from Smorgoni to Warsaw:

"The good of that Europe which seems to envelop her [England] with goodwill counts for nothing with the merchants of London. They would sacrifice every State in Europe, even the whole world, to further one of their speculations. If their debt were not so large they might be more reasonable. It is the necessity of paying this, of maintaining their credit, that drives them on. Later on, they certainly will have to do something about that debt. Meanwhile they sacrifice the world to it. The world will realize that in time: men's eyes will be opened, but it will be too late. If I triumph over them, Europe will bless me. If I fall, the mask of the English will fall soon after, and the world will see that they have thought of nothing but themselves: that they have sacrificed the peace of a continent to their monetary interests."

Such were Napoleon's ideas, and because he was a man possessed by a world idea, the idea was the man. It rendered him intractable and impossible to harness. There was no give or take in him: no man can argue with one obsessed by a messianic thought. He wanted peace, but solely on his own terms and at his own price. He said: "The English minority, and the libels of all the oligarchs in the world may say what they will, the Emperor Napoleon always wished for peace with England, because he regarded a general peace as the first condition of the regeneration of Europe."

Are not we once again confronted by such a man—Adolf Hitler: a man also possessed by a world idea? A man who, like the Corsican—a foreigner to France—rose from nothing to become everything, and who, like him again, was chosen leader of his people by popular vote. Listen how Napoleon described his rise to power to Montholon, and then compare—

"When deplorable weakness and endless versatility manifest themselves in all the acts of power; when yielding, sometimes to the influence of one party and sometimes to that of another, and living from day to day without any fixed plan, or any definite object in view, its possessors have exhibited the clearest evidence of their incapacity, and the most moderate citizens are compelled to agree, that the State is not governed; when, finally, to the incapacity of the administration at home, it is guilty of the greatest error which it is possible to commit in the eyes of a proud nation—viz., degradation in the opinion of foreign nations—then a vague restlessness begins to pervade the whole mass of society. It is deeply agitated by the fear of the loss of national reputation and honour; and turning its

eyes upon itself, it appears to seek for a man capable of effecting its deliverance.

"Such a tutelary genius is always to be found within the bosom of a populous nation, but sometimes he is slow to appear, and, in fact, it is not enough that he exists, he must be known by others, and known to himself, too. Till this happens, all attempts are vain, all intrigues powerless; the inaction of the multitude protects the nominal government, and, in despite of its incapacity or even its treasonable betrayal of the national interests, the efforts of its enemies do not prevail against it. But no sooner does this deliverer, so impatiently, expected appear, and give symptoms of his existence, than the national instinct divines it, and calls him to his post: obstacles disappear before him, and the whole of a great people unite, with one accord, and seem to say—'This is the man!'

"Such was the state of the public mind in France when the nation confided its destiny to my hands."

Hitler, like Napoleon, saw in England the one great obstacle in his path towards not the conquest of the world—the popular idea—but, instead, the impregnation of the world with his idea, so that a new world might be begotten. Physical conquest is but small fry to such a conquest—"I have a task for founding, and not for possessing," words spoken as we have seen by Napoleon, are I feel equally true of Hitler. Hence the ideological character of the present war.

Like Napoleon, Hitler realized the weakness and strength of his great adversary. With him he saw that England's financial system—"her debt" was, as Napoleon had said, a "devouring monster." And with him he held—once again quoting Napoleon's words—that "the political greatness of England consists in her navy, and not in those small armies which she has sent to the Continent. . . ."

Throughout all his many campaigns, Napoleon's one supreme problem was the overthrow of England. "Let us be masters of the Channel for six hours," he said, "and we are masters of the world."

Could he have attained this mastership in 1805, the year he was ready to invade England, the whole course of history would have been changed, and the world we live in to-day would be utterly different. So also at this moment and at every moment since September 1, 1939, has Napoleon's problem equally been Hitler's. To master the Channel or to starve the Channel-holders out are his key problems. Therefore every campaign he has fought since the overthrow of Poland must be related to them.

Chapter XIV

THE DIRECT APPROACH FIRST PHASE

UNDER COVER OF THE MAGINOT LINE, MORE SO THAN OF THE Siegfried, which was as much a hoax—an instrument of propaganda —as a defensive system, at dawn on September 1, 1939, the German armies some seventy divisions strong, under the command of Generals von Bock and von Rundstedt, swept into Poland on their trial run for the World Stakes. Eighteen days later the Polish Government, followed by thousands of refugees, crossed the Rumanian frontier. Thus in less than three weeks a great country was forced to capitulate and the first of the *Blitzkriegs* of the Second World War passed into history.

How was this possible? The answer is clear enough. In spite of their traditional bravery, the Poles were utterly outclassed in machine power. Though their army consisted of thirty infantry divisions and a considerable force of cavalry, it could muster only six battalions of light tanks and some 750 serviceable aeroplanes. Worse still, its High Command had never recovered from Pilsudski's victory of 1920.[1] Then, between August 14–20, the Battle of Warsaw had proved so miraculous an event that it completely blinded the Polish General Staff to the requirements of machine warfare.

The German tactics were exceedingly simple and overwhelmingly effective. Letting loose a powerful force of aeroplanes, the Polish fighting machines were annihilated and the Polish airfields wrecked. Simultaneously, all centres of communication and command were bombed and with such effect that, by September 4, the Polish High Command was paralysed and the Polish mobilization brought to a chaotic standstill. In *Free Europe*, of December 1, 1939, we read:

> "Their bombings were incessant and effective. Their command of the air gave the Germans three all-important tactical advantages: in the first place their chiefs knew and saw what was happening, whereas the Polish leaders were . . . in the dark; secondly, their orders were transmitted . . . without a hitch, whereas on the Polish side the link between headquarters and the troops . . . was broken, the railways came to a standstill, the roads were blocked; lastly, morale both at the front and especially behind the lines was seriously affected."

[1] See my *Decisive Battles*, Vol. II, chapter xxviii.

Under cover of this protective air barrage the German armoured and motorized divisions pushed forwards at such speed that, on September 9, General Reinhardt's tanks attacked the suburbs of Warsaw, 250 miles from their starting-point. On the 17th the Soviet armies crossed the Polish Eastern frontier; on the 30th the garrison of Warsaw surrendered, and on October 5 Hitler entered that city. The German losses as given out by him were 10,572 killed, 30,322 wounded and 3,400 missing, many of whom he stated had been massacred after capture. The Polish prisoners taken were claimed at 694,000.

The lessons of this first campaign of the war corroborated everything theory had foreshadowed. The paralysation of the Polish command by air attack was only equalled by the demoralization of the Polish infantry masses by tank attack; yet, strange as it may seem, these lessons were entirely lost on the French, who attributed the catastrophic collapse of their ally to the incompetence of the Polish General Staff, the numerical superiority of the Germans, the lack of frontier and field fortifications, and the intervention of the Soviet forces. They saw everything they wanted to see—things of subsidiary importance—and refused to see the one thing which above all mattered—namely, that it was the German war machine that had threshed out victory in eighteen days. Therefore this campaign remained a closed book to them.

The next campaign, which on November 30 was launched by the Russians against the Finns, instead of opening the eyes of the French, closed them yet more tightly. First, as should have been obvious to them, no sane power would pick mid-winter for an Arctic campaign, and that Stalin did so is surely explained by the fact that he was convinced that a show of force was all that was required to bring the Finns to book. Nevertheless it did not, and so it came about that those courageous people under the able leadership of Field-Marshal Mannerheim held up their gigantic enemy for four months, inflicting on him more casualties than there were men in their own army—namely, some 200,000 killed, wounded and missing.

What the French refused to see was: That this theatre of war was patently a non-tank one, an area covered with lakes, forests and snowdrifts. That though the Mannerheim Line—a flankless system of entrenchments linking Lake Ladoga to the Gulf of Finland—was a serious obstacle, once it was penetrated Finnish resistance collapsed; because, as the Finns had no tanks, it was not practical for them to face the Russians in the open.

Had the French possessed but a modicum of insight they would have deduced from both these campaigns the imminent danger in which they themselves stood, and could then have set out to rectify their war theory. Instead of doing so, instead of collecting

their regimental tank battalions and building them into an armoured striking force which could meet attack by attack, they called up category after category of reserves and poured them into the Maginot Line.

Thus, on the Western Front, the winter passed by in unbroken calm. By October the British had despatched to France 158,000 men, yet not a single modern medium tank, and, because of this lack, as Lord Gort informs us, his army was compelled to spend the winter constructing "pill-boxes," anti-tank ditches and breastworks, instead of training for the attack.

As to plan, the two Allied Powers had none outside passive defence. Their idea was that the Germans would not dare to assault the Maginot Line, and that under the protection it afforded the blockade would win through. This plan was largely forced on them, like a conjuror's card, by Hitler and his Siegfried hoax, the French argument running: Though the Siegfried Line is garrisoned by no more than 35 divisions, as we dare not attack it, is it likely that the Germans will dare to attack our Maginot Line which is garrisoned by 70 divisions?

In England this was the view generally held:

> "French military policy is well known. General Gamelin, one of the ablest soldiers in Europe, went through the Great War as a Staff Officer and learned many lessons. He is not only a shrewd strategist, but is an exponent of the doctrine of conserving the man-power of a nation by every possible means. It is well known how the tragedies of Verdun and Passchendaele impressed themselves upon him. He is known to count the value of every division, of every life in each unit. This is not to say that he would not consider a general offensive in the West. It is to say, however, that he will not do so until the fullest preparations have been made and there is a fair and lively chance of success."

The character of Hitler as a war leader was totally misread, because so much time was spent in anathematizing him that none was left over to understand him. It was generally held that his object was to neutralize France not by attack but by refusal to do anything at all. Therefore, it was argued, nothing would suit his book better than were France and Great Britain to assume the offensive. Nevertheless, should Hitler attack, then "The armies of France would become engaged in the defence of their country, and all the magnificent qualities of the French nation would find expression at once. Political differences would diminish, and German propaganda would become worthless."

So pacific did the war become that, in the early spring of 1940, the French problem was one of how to draw men out of the army back into civil life in order to keep the home fires burning. Further, it was considered that, even were the garrisons of the Maginot Line reduced, the power of the modern defensive was so great that those left to hold it would have ample time wherein to cover the completion of a fresh mobilization. "Hardly anything," writes one exponent of this return to bloodless warfare, "can be so dangerous as to keep vast forces mobilized and unengaged over a long period. If the Germans like to try it, so much the better. If they do not, we shall all be level." It occurred to nobody that there was yet another alternative, which fitted in with two hundred years of Prussian history—namely, that the Germans might take it into their head to attack. Least of all was this suspected or even imagined by the British Prime Minister, for on April 4 he said: "Is it not a very extraordinary thing that no attempt to overwhelm France had been made? Whatever may be the reason—whether it was that Hitler thought he might get away with what he had got without fighting for it, or whether it was that after all the preparations were not sufficiently complete—however, one thing is certain: he missed the bus."

Five days later there burst upon a dreaming world the most astonishing whirlwind campaign in history. Suddenly, on April 9 and 10, as if by magic, Denmark and Norway were occupied by the Germans. What they accomplished in these forty-eight hours borders on the miraculous; nevertheless its explanation is both logical and simple. Once again the miracle was no more than the triumph of machine power and this time in ideal conditions. In face of Great Britain's overwhelming naval superiority the German command of the Skagerrak was gained, because German aircraft could operate from Danish airfields and German submarines from Wilhelmshaven. The small Norwegian fleet was sunk; all airfields in southern and central Norway were seized, also all main ports, the more important cities, military centres and depots and the termini of the Oslo-Trondheim, Oslo-Bergen and Oslo-Kristiansand railways and roads. This not only meant that all means of movement passed into German hands, but simultaneously out of those of the Norwegians and their allies, the British and the French, who in the suddenness of the occasion at first thought that Hitler had gone mad.

Nothing was further from the mark. Instead of this invasion being the act of a lunatic it was a stroke of uncommon genius, carefully planned and most carefully prepared. Above all things it clearly showed that the governing aim in the Hitlerian strategy was the isolation of Great Britain. If her invasion was as yet impossible,

this campaign at least rendered it possible to turn the blockade tables upon her. Axel Heyst, writing of it a few months later, was nearer the mark when he said: "His [Hitler's] action in Norway must be reckoned as one of the most brilliant manœuvres in modern military history." Then, summarizing its results, he wrote:

> "Germany now possesses a long coast-line stretching from Narvik down to the French coast. Never in her history did England possess such a long line to defend. . . . From the position of besieging Germany—or rather pretending to besiege Germany, as the British threat was never serious or effective in this war —Great Britain is turned into a besieged country. From a blockading Power she is slowly moving towards the position of a blockaded one."

This, at the time, was pointed out in the *Frankfurter Zeitung* of April 21, as quoted by Philip Graves in his *The Third Quarter*:

> "Here, too, are the runways which provide us with a strategic spring-board to England and . . . the North Sea. Was it really a gigantic mistake (as the English maintain it was) to take possession of this jumping-off ground in a life and death struggle against Great Britain, instead of leaving it, plus the whole of Scandinavia with its strategic and economic advantages, to the enemy?
>
> . . . . .
>
> "Having achieved the initial success, apart from economic advantages to be derived therefrom, we shall be in a position to tie up and weaken the Franco-British air and naval forces, and to compel Britain to fight. . . . The weakening of the Western Powers will be noticeable sooner or later—in the North Sea as well as in other waters where the British and French have vital interests, the Mediterranean in particular. The naval superiority of the Western Powers rests, not with their actual fleets, but with the margin of those fleets over other Powers. This is a very important calculation for all who look to the ending of Franco-British naval supremacy for satisfaction of their claims to *Lebensraum*. Nowhere has the connexion between the North Sea and the Mediterranean been more strongly emphasized during the last few days than in Italy."

I do not intend here to enter into the history of this campaign, except to point out that the gallant attempts made by the British and French to support the Norwegians were from first to last doomed

to failure. First because the ports of Narvik, Namso and Aandalsnes, at which landings were made on April 15, 16 and 18, were too ill-equipped to permit of tanks, guns and anti-aircraft artillery being landed; and secondly because no airfields could be seized. This meant that the nearest British airfields were those in Great Britain—that is some 300 miles distant from the landings, and, therefore, that fighting machines could not co-operate. The result was that the Allied Powers suffered such heavy shipping losses that on the 27th a withdrawal was ordered. Thus the invasion in the face of modern machine power ended in a fiasco.

The lessons to be learnt from this the first of the great air invasions in which thousands of men were transported and supplied by aircraft, were entirely lost on the French.

(1) They could not, or rather would not, see that this electric third-dimensional offensive cut the foundation from under the defensive idea upon which their Maginot Line was built.

(2) Nor could they see that the seizing of air bases was an essential in the machine attack, and that resistance depended on machine power and not on man power, and that the more rapidly machine power was developed against an enemy the greater was his paralysation: velocity and not weight of attack was its essential characteristic.

In fact, the whole operation was so novel in character that, as we shall see later on, neither the Germans nor the British succeeded in extracting from it the dominant lesson—namely, that an overseas invasion in face of air attack is not a practical operation of war. Further, that, as a machine army could only be landed at a well-equipped port and that such were few in number, these ports could definitely be denied to a would-be invader not by entrenching and garrisoning them, but by holding in reserve at some central point between them a powerful air-striking force.

The next blow fell with equal suddenness, and to-day it can clearly be seen that it was no more or less than a logical sequence to the first. If, as is the case, the defeat of Great Britain is Germany's main object in the war, and if, as is also the case, the British Isles cannot be directly invaded so long as British command of the sea holds good, in order to invest them it was now necessary to prolong the Norwegian wall of circumvallation south-westwards by establishing airfields and submarine bases from Holland to Western France. To accomplish this end not a moment was lost. So it came about that, early on the morning of May 10, Holland and Belgium were invaded. A few hours before this third lightning campaign was launched, the Führer issued to his Western Armies the following proclamation:

"The hour has come for the decisive battle for the future of the German nation. For 300 years the rulers of England and France have made it their aim to prevent any real consolidation of Europe and above all to keep Germany weak and helpless. With this your hour has come. The fight which begins to-day will decide the destiny of the German people for 1,000 years."

In this campaign, which five weeks later ended with the collapse of France, the first tactical point to bear in mind is that, as in the case of Poland and Norway, it was a contest between machine power and man power. The French and British forces numbering together some 4,000,000 men, though well motorized, were indifferently mechanized, whereas the Dutch and Belgians, numbering about 900,000 men in all, were neither the one nor the other. Each possessed a few light tank units and no more than 200 effective aeroplanes. Their frontier defences were, however, modern, and could in many places be strengthened by inundations. These, however, meant nothing to the German air force, and cubic warfare was to decide the issue.

As the German advanced guards moved forward, simultaneously powerful air formations swept over them, their objectives in order of importance being :

(1) The Dutch and Belgian air bases.

(2) The Dutch and Belgian points of concentration and communication.

(3) The cities and towns in which co-operation had previously been arranged with agents and sympathizers—the so-called Fifth Columnists.

Over the last of these objectives many parachutists were dropped — riflemen, dynamiters and panic-mongers. These heroic dare-devils—for literally they carried their lives in their hands—both by word and action stampeded the population. The result was that all roads were soon blocked by hundreds of thousands of panic-stricken refugees, causing incredible difficulties to the Dutch and Belgian troops and later on to the French and British.

The main German air attacks were directed against the Rotterdam and The Hague airports. To seize the former, at 5 a.m. a number of troop-carrying Dornier flying-boats alighted on the river Maas in the centre of the city, and before the Dutch realized what was happening the road and railway bridges were occupied without resistance. At the same time German troop-carriers landed on the Waalhaven aerodrome. One writer says : "At one

time they were landing at the rate of 500 [men] the hour. And every now and again aeroplanes would drop their load of parachutists, who came down like a distant swarm of white butterflies in the fields outside the city."

The immediate result of these vertical attacks was confusion, terror and panic, under the protective cover of which the ground troops advanced.

> "The taking of the Maastricht bridge," writes the author of *The Diary of a Staff Officer*, "is a fairy tale, amazing in its daring. A plain-clothes man walked over to the sentry on the bridge on the East bank and asked him, as a friend, to allow him across the bridge for a last word with a pal on the West bank. He was allowed to pass, he walked across the bridge, and after a few minutes' conversation strolled back towards the sentry with his friend. This second man then, gangster-like, shot the sentry and bolted back to the far bank, where he disconnected the wiring of the mines prepared for the destruction of the bridge. While this was being done, the first man possessed himself of the sentry's rifle and easily prevented any interference. The timing was a work of genius; within a few minutes, parachutists and gliders descended in a cloud on the top of the Dutch fortifications and the Belgian fortifications west of the bridge which is just in Dutch territory. The Germans ran around pushing hand grenades into loopholes, throwing bombs into gun emplacements and casemates, and generally playing hell with the place, literally before anyone realized that an attack was about to develop at all. They threw their bombs into open doors, into the turrets of the casemates, and within an hour, with the loss of only 300 men, the Maastricht bridge-head was established. It had never been supposed that such an achievement would cost less than 50,000 lives."

I have quoted this really remarkable exploit in full, because it is an excellent example of what velocity of attack means in war, also of the weakness of powerful two-dimensionally designed defensive works to resist the third-dimensional attack.

The advance into Holland was literally a machine race. On the 13th the Queen of Holland and her Government fled to England, and on the following day—that is, less than 100 hours from the start—German motorized troops linked hands with their air-dropped troops in Rotterdam, when in order to bring Dutch resistance to an end that city was mercilessly bombed. The result was

capitulation, the Dutch Commander-in-Chief, General Winkelman, ordering his troops to cease fire.

Commenting on this amazing campaign, S. L. A. Marshall writes in his book *Blitzkrieg*:

> "The striking force paid but little attention to the consolidation of a general position and to the maintenance of communications. The principles of security and of keeping forces in junction were largely ignored. Most of the accepted rules of warfare were flouted in order to effect a concentration on moral means.
>
> "Largely because of that fact, the goal was achieved in four days, the lightning conquest of all time. Prudence was humbled by audacity, Resolution bowed to shock and to surprise."

Not so, however, the French—still in a somnambulistic trance—because they forthwith set out to commit suicide. Seeing that their enemy had not the slightest intention of battering his head against the Maginot Line, and that instead he had turned it, and seeing that their own policy was defensive, instead of abiding by it and drawing every man and machine from east to west to form a mobile reserve in rear of the Maginot Extension, which ran from about Longwy to the Channel, they decided to abandon it and advance into Belgium. In other words, the great crustacean unshelled itself and moved forward a 1918 army naked of defences to meet its 1939 adversary clothed in armour.

Nothing could have suited the German plan of campaign better. In accordance with it two groups of armies were operating in the West: General von Leeb's against Holland and Northern Belgium, and General von Rundstedt's against the Ardennes and the line of the Meuse. Therefore, by advancing north, the French and the British put themselves between the jaws of the pincers, for should von Leeb hold them in front, then von Rundstedt was well placed to attack them in rear.

The awakening of the French was rude and sudden, because, even before they and the British could fully take up their positions east of Brussels, they learned that the fortified zone to the south of them, between Sedan and Dinant, had been breached; that the French Army under General Corap, composed of elderly Territorials and half-trained Senegalese, had been routed, and that the bridges over the Meuse were in German hands.

Without a pause the Germans pressed on. On the afternoon of the 14th it was learnt that Sedan had fallen, and then, at midnight, that a salient some fifteen kilometres wide and ten deep had been punched into the French fortified zone at a point held by

inferior Parisian troops. At once the French left wing was ordered to withdraw west of Brussels, which on the 15th it set out to do. On the 16th the anonymous author of *The Diary of a Staff Officer* wrote :

> "The whole development of the southern front in these seven days has been so fast and has been conducted on such unorthodox principles—principles of neck or nothing to the *n*th degree—that it is hard to believe the situation is so precarious as it is in fact."

Then, again, on the 17th :

> "The German armoured divisions are too much for them. It is Poland over again. . . . Talk of the B.E.F. withdrawing to England. This seems deplorable. The whole collapse began through the miserable morale of the fortress troops."

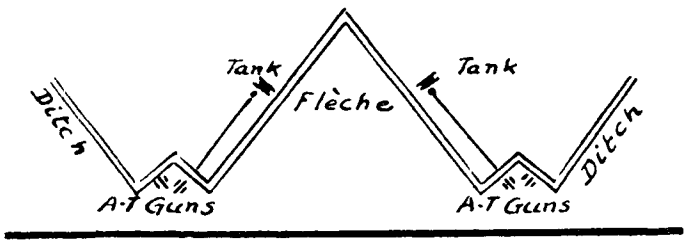


Diagram 14

This day the breach in the French defences was sixty miles wide and German tanks reached Mauberge in the north and Rethel in the south.

The German tactics of penetration, so far as they are as yet known, were as follows. The armoured forces were organized in two groups ; the duty of the leading group was to rupture the French defences and of the one in rear to exploit the penetration.

The defences were first of all heavily bombarded by artillery and dive-bombing machines. Then, under cover of a smoke barrage, the leading tanks advanced on the zig-zag anti-tank ditch, behind which was built an anti-tank palisade. Each *flèche* of the ditch was enfiladed by two anti-tank guns which could take in flank any tanks approaching it. This difficulty the Germans over-

came by sacrificing a tank on either flank of the point of the *flèche*. When these machines were put out of action, they masked the fire of the anti-tank guns, and by doing so formed a shielded passage for other machines to move up to the ditch, bridge it and then demolish the palisade.

This done, once again under cover of smoke, the tanks advanced on the concrete emplacements and block-houses (pill-boxes) and forcing them by means of flame-projectors to close their loopholes, the heavy tanks pulverized them with their 4.4.-inch guns firing 48-lb. shells.

Once a breach was made, the tanks of the first group by wheeling right and left widened it, and then took the defences in rear. Meanwhile the second group, followed by motorized troops, passed through the gap, and spreading out fanwise inundated the entire area in rear of the defences. On the 19th we read in *The Diary of a Staff Officer*:

> "News that the *Panzers* are in Amiens. This is like some ridiculous nightmare. . . . I have told myself again and again that the German threat could not be sustained. Against all the rules of warfare, it has been sustained. The Germans have taken every risk—criminally foolish risks—and they have got away with it. They have laid themselves open to destruction from the air in close columns, they have laid themselves open to attack from exposed flanks, they have made themselves vulnerable by allowing their mechanized units to outstrip by far too great a distance their main body, they have done everything that should not be done by orthodox book-trained stereotyped soldiers and they have made no mistake. The French General Staff have been paralysed by their unorthodox war of movement. The fluid conditions prevailing are not dealt with in the textbooks, and the 1914 brains of the French generals responsible for formulating the plans of the allied armies are incapable of functioning in this new and astonishing lay-out."

The secret behind all this was—"Velocity." The speed with which a defensive line was penetrated, and the speed of the inundation which poured through. Once the open back areas were reached, forward went the motor cyclists and light tanks, which on a good road could move at forty-five miles the hour. Nothing stopped them, for if opposition was met with, they either circumvented it, leaving it for the advanced guards in rear to deal with, or they attacked in rear. As Wilhelm Necker has noted: "German warfare is [motorized] guerilla warfare upon the grand scale, and it can only be countered by [motorized] guerilla warfare."

Villages were thrown into panic, railway stations raided and telegraphic and telephonic communications cut. The French system of command was paralysed. The Germans became both invisible and ubiquitous, and it was the velocity of their movements which rendered them so. At one moment they were reported in one locality, then gone to be reported in another. They appeared to be both everywhere and nowhere. "It is strange, indeed uncanny, the emptiness that follows in the wake of the *Panzer* divisions," writes one eye-witness, and it was this void more so than anything else which paralysed the French command, when, in turn, that command paralysed the French soldiers. Subconsciously the men felt that they were fighting a pestilence rather than a living and physical enemy.

It is this ubiquity, I think, which accounts for so many bridges having been left intact. For as the Special Correspondent of *The Times* pointed out on May 25: "Should mechanized forces succeed in outflanking the defenders and in continuing to advance behind them, it is difficult for sappers to take the decision to carry out demolitions, which, while possibly hampering the advances of the tanks, would also embarrass the retreat of their own infantry."

When serious opposition was met with, such as strong anti-tank defences, it was at once dealt with by tanks and dive-bombers—flying artillery—working together as a unit, the tanks setting the direction. The author of *The Diary of a Staff Officer* says: "It is the co-operation between the dive-bombers and the armoured divisions that is winning this war for Germany," and again: "German dive-bombers . . . have proved . . . irresistible in conjunction with tanks in this campaign."

By such tactics of velocity, of direct punches and of outspreadings, on the evening of the 20th German motor cyclists occupied Abbeville close by the mouth of the river Somme, cutting the French left wing off from the rest of the French Army.

In such an amazing advance as this, one is apt to overlook the fact that velocity ultimately depends upon administration—supplying and engineering, and that these two Services must work hand in glove, because supply cannot be maintained if roads have been blown and bridges destroyed. First of all every tank was self-contained as regards spare-parts—a vital necessity, yet often overlooked. Secondly, tanks lived on the country whenever it was possible—that is to say, they picked up such petrol as they could find. Thirdly, when that was impossible, they were refuelled by air. Yet, sooner or later they had to be re-supplied by road, and it was then that the magnificent German field engineers came to their aid. Roads were repaired with amazing rapidity and bridges also.

During the Spanish Civil War I once had the good fortune to watch a German bridging train at work. It was in the Asturias during the advance on Gijon, and practically every bridge—of which there were hundreds—was blown. When the bridging train appeared I was astonished to find that the bridges were already made up in sections, like a child's Meccano. All that was necessary was to unload them from the lorries, bolt them together, sling them over the gap, and lay a roadway. It is true that in the Asturias most of the bridges are of small span ; nevertheless I have no doubt that the same system was used in France.

Once Abbeville was in German hands the strategical picture became as follows. To the south the bulk of the French fighting forces still held the Maginot Line from the Swiss frontier to about Longwy, and thence westwards along an uncertain front extending by way of Rethel, St. Quentin and Peronne to St. Valery at the mouth of the river Somme. Meanwhile to the north the French left wing, including the British Expeditionary Force under General Lord Gort, was rapidly being squeezed into a severed salient, a triangular area running from near Boulogne to about Bruges and thence southwards to Arras, with its third side—Arras-Boulogne—completely open. Following the theory of salient warfare, as described in Part II, beyond all question the correct thing for the Germans to do was to establish a protected flank and rear along the Somme and from it swing their armoured forces northwards on the line Boulogne-Béthune-Lens—that is, against the rear of the Franco-British left wing. This they did, armoured divisions rapidly advancing on Boulogne and towards Béthune and Lens.

By the evening of the 21st Lord Gort received information that the Germans were approaching Boulogne, and twenty-four hours later that they were within nine miles of Calais. Thereupon he withdrew his 5th and 50th Divisions, then operating in the Arras area, northward. The following day he says: "Information received . . . indicated that two enemy armoured divisions were converging on Calais and two more, supported by a motorised S.S. (Schutz-Staffel) division, on St. Omer. A fifth armoured division appeared to be moving on Bethune."

On the 26th the position of the Franco British forces is described by Lord Gort as "a corridor in shape" with "both flanks resting on the sea." The southern end of which was blocked by the French 1st Army, "and each side was manned, for the greater part of its length, by British troops." Actually it was a rectangular "salient" the flanks of which were protected by the inundations of the Aa and Yser rivers. The "front" was held by the French 1st Army, while its rear between Gravelines and Nieuport was open to the sea.

The country itself was admirably suited to anti-tank warfare, because it was cut up by canals and innumerable dykes.

On the 26th the position became so critical that Lord Gort was ordered by the British Government to withdraw to the beaches and ports east of Gravelines, and there prepare to embark his army. This, at once, he set out to do.

The next day the Belgian army, led by King Leopold, capitulated, when it must have appeared to the Germans, that the Franco-British left wing was doomed. If so they were mistaken, for once again, as has so often happened in their history, the British rose to the occasion, and, not for a moment admitting their defeat, set to work to improvise their salvation. This resulted in what has become known as "The Miracle of Dunkirk."

Nevertheless its elements were in no way supernatural ones.

Not only was the area itself an anti-tank fortress, protected by two wet moats, but as its rear lay along the sea coast, it could not be attacked from that direction ; therefore it could only be attacked on its southern front, where, so long as the Franco-British rearguards fought staunchly from dyke to dyke and canal to canal, each dyke and each canal had to be stormed in turn. It is, I suggest, in these tactical conditions that the secret of the miracle must be sought, and even more so than because during the evacuation the sea was calm, the rescue work magnificent, and the thick weather a hindrance to German dive-bombing attack.

By June 3, when the evacuation was completed, the numbers saved must have both astonished and exasperated the German High Command. "In all," writes Lord Gort, "211,532 fit men and 13,053 casualties were embarked at Dunkirk and the beaches in addition to 112,546 allied troops." Truly an amazing performance and a triumph of improvisation, in spite of the fact that all equipment was lost.

> "So ended a campaign of 22 days," wrote Lord Gort in his *Second Despatch*, "which has proved that the offensive has once more gained ascendancy in modern war when undertaken with an army equipped with greatly superior material power in the shape of air forces and armoured fighting vehicles."

And of his opponent he said :

> "The speed with which the enemy exploited his penetration of the French front, his willingness to accept risks to further his aim, and his exploitation of every success to the uttermost limits emphasized even more fully than in the campaigns of

the past, the advantage which accrues to the commander who knows how best to use time to make time his servant and not his master."

The rest is soon told, for on June 5—that is, only two days after the Dunkirk evacuation was ended—the Germans launched a violent offensive along the southern front. On the 10th Italy declared war on France. On the 13th M. Reynaud, the French Prime Minister, aping Clemenceau in 1918, declared: "The enemy is almost at the gates of Paris. We shall fight before Paris, fight behind Paris," etc., etc. Next day that city was occupied by the Germans.

Then General de Gaulle urged that the river Loire should become the new front. It was a fantastic dream in face of German war machinery. The truth is, that the sole alternatives were capitulation or revolution, and as the second would only have led through a sea of blood to the first, it was wiser for France to acknowledge her defeat, in any case unarmoured heroism in face of machinery is pure foolishness.

Before turning to the influences of this catastrophe on the furthering of the war, I will briefly set down the more important causes which underlay the French collapse.

First and foremost was the one I have accentuated again and again—namely, that man power is no match for machine power; therefore had all the remaining causes been non-existent, the total defeat of France, though it might have been postponed, could not have been averted.

Secondly, it may be asked: Had the Maginot Line been prolonged from Longwy to the Channel, would not France have been saved? The answer is "no!" Because there is not such a thing as an impenetrable line of fortifications and once a line is penetrated by armoured forces, unless they can be met by their like, rapid exploitation is all but inevitable.

Thirdly, there was neither unity of government nor of command nor of thought in France. As in nearly all previous wars, the first disasters brought with them political changes. As early as May 18 the Daladier Government fell and was succeeded by the Reynaud, with Marshal Pétain as Vice-President of the Council and General Weygand as Chief of the General Staff. Reynaud was a windbag who believed in miracles, but he overlooked the fact that this is the Age of Machines. He was but another blind crusader.

Fourthly, the morale of the troops had been rotted by that over-sexed dilettante and political humbug Léon Blum and the open treason of his utterly corrupt government. And it certainly was not improved when French soldiers became aware of the

somewhat obvious fact that a woollen jacket is no equivalent for tank armour.

Fifthly, as I have already pointed out, the whole French theory of war was not only obsolete but decadent. Anchored firmly to the Maginot idea, throughout the campaign the French General Staff tried to hold everything by patching up holes, instead of concentrating and punching holes. In turn, the British were all but totally unmechanized, their one and only armoured division arriving in France on May 21! Further, their air tactics were lamentable. The greater part of the Royal Air Force was held back for home defence, when the one and only target was the rapidly advancing German forces. Even such machines as were sent to France seem to have been employed mainly on raiding German cities, instead of bombing bridges, columns, points of concentration, etc., on the German lines of communication. The personnel was admirable, the command was damnable.

Finally, what did this campaign cost in life and limb? Probably the French lost 60,000 killed, 300,000 wounded, and between one and two million men made prisoner. The Germans, up to June 4, lost 10,252 killed, 42,523 wounded, and 8,463 missing. And until these figures are disproved on full evidence, I accept them as being provisionally correct, for they are in accordance with what I expected. In the First World War and on the first day of the Battle of the Somme, when no tanks were used, the British casualties were 60,000, whereas on the first day of the Battle of Amiens, the greatest mechanized battle fought in 1918, they were slightly under 1,000. But the British had not studied the last war with an eye to the future. Therefore they acclaimed that the Germans had lost between four and five hundred thousand in killed and wounded. Such figures are the full measure of British ignorance of what machine war meant.

The collapse of France and the entrance of Italy into the war profoundly changed the strategical situation of Great Britain. All the vast preparations the English had made for a continental war came crashing to earth, and what was even worse, England's very existence was threatened by the extension of the German air and submarine bases from the Ems to the Bidassoa. From the position of a blockader the English suddenly found themselves in that of the blockaded. The French fleet could no longer co-operate with their own, and fear that it might fall into German hands led to an attack being launched on the French warships at Oran and Dakar on July 3 and 7 respectively. In my opinion this was a political blunder of the first order, comparable only to the imposition of economic sanctions on Italy in November, 1935, because it very naturally drove France into the arms of Hitler. Further, coming as it did, but

a little over a fortnight after Mr. Churchill's dramatic Declaration of Union, according to which every citizen of France was to enjoy immediate citizenship of Great Britain and *vice versa*, it made British policy look ridiculous.

As bad, and collateral to this blunder, the entrance of Italy into the war uncovered the road to Egypt. By forcing the British to abandon Malta as a naval base, it lost to them the command of the central Mediterranean, and by doing so opened the route to Libya. As important, by compelling the British to fall back on the Cape of Good Hope as their main line of supply to Egypt and the Near East, the more than partial closing of the Mediterranean struck a formidable blow at their shipping, because the Cape route to Suez is over four times the length of the Mediterranean to Port Said.

However, these changes which, as we shall see, were profoundly to influence the future of the war, were at the time completely overshadowed by the fact that, as in 1588, a hostile army was now encamped on the southern shore of the English Channel. This logically brings us to the second phase of Germany's direct approach on England—now her sole enemy.

Chapter XV

THE DIRECT APPROACH, SECOND PHASE

THE BACKGROUND OF THE SECOND PHASE OF THE DIRECT APPROACH on England was painted in by the most successful piece of propaganda that so far stands to the credit of that vile method of mechanical attack. As Holland, Belgium, and France were being pulverized, William Joyce—the Lord Haw Haw of the masses—day in and day out thundered through the ether the impending doom which awaited the English, daubing in lurid colours the terrors of invasion.

To myself this was highly suspicious, if only because the German army never has been organized for such an operation of war. Further, the mere fact that that army was highly motorized and mechanized, has, as I have shown, vastly increased the difficulties of landing on a hostile shore. And again, Southern England, the more likely area to be invaded, is so fenced in that it is a most difficult area for tanks to operate in.

Nevertheless, this propaganda had its effect, and when coupled with the seeming omnipotence of the German Army, and above all with the parts played by parachutists and Fifth Columnists in Norway and Holland, these unceasing outpourings of lurid horrors, impinging on the utter unpreparedness of England, awoke such terror in the souls of the people's editors and leaders that, as S. L. A. Marshall says in his book *Blitzkrieg*, "the problem of home defence took precedence over the fate of the B.E.F. and the Franco-British military alliance."

A veritable panic howled through England. The names of railway stations, hotels, inns and taverns were obliterated and all signposts on the roads were removed ; for not a moment's thought was given to the result—namely, should the enemy invade, the first thing to do was to attack him, and, consequently it was of the utmost importance to facilitate and not impede road movements. Further, parks were furrowed with trenches, fields were decorated with innumerable May-poles, block-houses were erected in cities, towns and villages, and what was most un-English of all, a Fifth Column was invented and the notorious Defence Regulation 18B put into operation, hundreds of people being arrested and thrown into jail without charge or trial. At length the appearance of Cooper's Snoopers put a term to this folly—people began to laugh and the panic subsided.

Was this English? No, it was dago! For throughout the history of England treason has never played more than a walking-on part. Of all people in the world the English are the most critical and the most loyal. No government pleases them, and this no doubt is why they have so greatly succeeded in spite of their Parliamentary System. Yet, when a crisis arises which threatens England, the number of traitors so far produced can be counted on the fingers of one hand—if that. Who are they? Name them? Guy Fawkes is the most celebrated!

It was a pitiful thing for England that at this critical moment her leaders could not hark back to the only comparable time when such a crisis had faced their ancestors—namely, 1588. Then that redoubtable Englishman, Sir Francis Drake, fearing that the English Catholics would support Philip II of Spain, wrote to Queen Elizabeth :

> "For the love of Jesus Christ, Madam, awake thoroughly, and see the villainous treasons round about you, against your Majesty and your realm, and draw your forces round about you, like a mighty prince, to defend you. Truly, Madam, if you do so, there is no cause of fear. If you do not, there will be danger."

But Elizabeth was even more English than Sir Francis, therefore, instead of setting about to suppress the Catholics, she appointed Lord Howard of Effingham—an alleged Catholic—"Lieutenant-General, Commander-in-Chief, and Governor of the whole Fleet and Army at Sea," and freely admitted Catholics into her land and sea forces. She did so because she knew that, although these men favoured Philip's religion—and in those days religion was politics—first and foremostly they were English : men who would die fighting rather than let a single Spaniard tread England's soil. As events proved, she was right, for hand in hand and shoulder to shoulder Protestant and Catholic sailors routed the Invincible Armada.

Instead of remaining calm, instead of remaining English, out of the dung of this propaganda sprouted the half-mythical tree of invasion, and ever since then, under its spreading branches, the English have sat in a shadow-land of defensive unreality.

Instead of preparing against such a possibility with calmness and circumspection, Mr. Churchill thundered forth the impending danger, and has never for long ceased to thunder it forth—"Perhaps it will come to-night. Perhaps it will come next week," etc., etc.

Not for a moment do I wish to suggest that Mr. Churchill does not know what he was talking about, nor that his information is not vastly superior to my own. Yet, what I do wish to suggest is this : Seeing that the Germans are unlikely ever to be defeated until they are gripped by the throat, instead of panicking at the idea of invasion, it would have been far better to have welcomed it. For had it been attempted, even immediately after Dunkirk, for reasons I hope I have already made clear, and here hope to make clearer still, the chances of it succeeding were indeed small. What, as an Englishman, I should have gloried in listening to is this : Mr. Churchill over the radio offering Herr Hitler a free present of 100 Thames barges which at any time convenient to him he could fetch away from the Pool of London under a flag of truce.

As I am not one of those who glory in appearing wise after the event, the following are the views I held at the time and still hold They are extracted from an article entitled, "They will try Blockade before Invasion," which appeared in the *Sunday Express* of June 2, 1940 :

> "Let us look at this problem and think it out.
>
> "Direct invasion by sea, such as Napoleon prepared for, may be ruled out for the present.
>
> "Yet indirect forms are possible, not because ships are no answer to airplanes, but because, when we have whittled strategic power down to its ultimate, we find that food, or rather the obtaining and distribution of food, is its basic factor.

"To expect the Germans to assault us at sea in old-fashioned Trafalgar style is as foolish as a few months ago it was to expect them to assault the Maginot Line proper.

"Whatever our enemy is, he is no fool, and anyone who has followed his unceasing broadcast attacks on our economic and financial systems must realize that he is fully aware that direct invasion of these islands is not possible unless it is preceded by their economic collapse.

"Blockade must, therefore, precede invasion, when, in my opinion, it is likely to take on one of two forms, or both simultaneously.

"Our 'Achilles' heel'—that is the weakest link in our strategic harness—is instead of growing we import the bulk of our food, in peacetime £400,000,000 worth a year.

"If this food can be stopped entering our ports we are blockaded. And if our exports, which pay for this food, can be prevented leaving our ports, we are also blockaded, because the pound sterling will lose purchasing power,[1] and in consequence the cost of food will rise.

"What this cost is to-day I do not exactly know, but it must be well over £500,000,000, and it is steadily rising.

"Not only is the maintenance of our import trade vital to us, but also the maintenance of our export trade, and it is against this that the Germans will strike.

"Therefore they will strike:

"(1) At our ports—the mouths which inhale and exhale imports and exports;

"(2) At our manufacturing centres, not only at those engaged on munition production, but also at those producing marketable commodities; and

"(3) As these blows will be dealt by air power, their first objectives will be our airfields and aircraft factories.

"As (3) reduces our defensive power, more and more will (1) and (2) come into operation, until a time may arrive when we are reduced to the verge of starvation.

"Then a fourth objective will enter the field—the direct attack on the civil will in order to cap starvation with panic.

"Then, and then only, in my view, will direct invasion become possible, not only by troop-carrying aircraft and parachutists, but also by sea. . . ."

As German naval inferiority was the dominant factor which governed the problem of a German invasion of England, it would

[1] As I write, November, 1941, I believe I am correct in stating that on the New York free sterling market the £ is quoted at about $2.00.

appear that Herr Hitler gave way to the contention of his air experts that it could only be remedied by gaining a decisive victory in the air, and that such a three-dimensional operation in conjunction with submarine minelayers and speed boats on the sea, would wrest the command of the Channel, anyhow temporarily, from British hands. Therefore, as I thought at the time and as I still think, the German scheme of invasion strategically reduplicated Napoleon's. Did certain contingencies arise, in the one case the absence of Nelson and his fleet in the West Indies, and in the other the knocking-out of the British air force, an invasion was worth attempting, otherwise not. In any case the mere threat of it would force the British to expend hundreds of millions of pounds as well as of man-hours of work on purely defensive preparations, instead of on offensive ones. Invasion would in fact stimulate that stockade-blockade mentality to which the Germans owed so much.

Having dealt with the subject of invasion fairly fully in Chapter XII, it is not necessary here for me to enter into details concerning German difficulties, other than to point out the following:

(1) An invasion on a decisive scale demanded the disembarkation of considerable forces of tanks, and, therefore, the prior occupation of a number of well-equipped ports.

(2) At the time the British forces were all but deficient of these weapons, nevertheless, as I have noted, the English terrain is in general of an anti-tank character. Further, the island itself is so small and narrow that such tank units as existed as well as anti-tank units could be kept concentrated, like fire brigades, at a few central positions and rushed to any point of landing in a few hours.

(3) There was no Fifth Column in England, except the fictitious one manufactured by over-excitable politicians. Therefore parachutists were at a discount.

(4) The British Air Force was virtually intact, as it had played but a secondary part in the Battle of France, and though outnumbered by the German it was in a state of high efficiency.

(5) The preparations made from Norway to Cherbourg were so elaborate and visible that a surprise invasion was not possible.

In England, the panic of Dunkirk now having subsided, few paused to consider what the problem of invasion entailed. Thus, as Necker points out, few had examined the German invasion of the Russian island of Oesel on October 12, 1917. He writes: "Oesel is about six times the size of the Isle of Man. A battle fleet of 400,000 displacement tons and a transport fleet of 154,000 registered tonnage, brought a force of 35,000 bluejackets and 25,000 soldiers across the Baltic. They were preceded by a flotilla

of mine-sweepers in two sections." That works out at nine tons of shipping per man, which I believe is about normal.

Writing on this subject in the *Evening Standard* of September 21, 1940, I entered into some hypothetical detail, which I will condense here in order to show what a few of the difficulties are which face an invading mechanized force.

I took as my measure 100,000 men divided into five mechanized divisions each of 8 tank battalions and 4 of other units, each of the former equipped with 45 machines and 60 vehicles. In all I reckoned that each division would include 360 tanks, 250 motor-cyclists, and 960 gun tractors, armoured cars and vehicles, to which must be added at least an equivalent number of lorries for supply columns, ammunition columns, etc. In all, therefore, there will be 1,800 tanks, and 9,600 vehicles of various kinds, without counting 1,250 motor cyclists. And to take one item of supply only, for a seven days' mobile campaign this 100,000-strong army will require 2,750,000 gallons of petrol.

Next, turn to the problem of shipping. Leaving normal steamships out of account, what will such a force require in motor-driven or towed flat-bottomed boats or barges? Though the answer depends upon size, it also suggests that these vessels will not be of immense proportions, because it must be expected that many will be lost *en route*, and consequently the larger they are the greater will the loss be. Leaving out of account the men, who can travel with the vehicles, I will assume that a barge can carry either 6 tanks or 12 vehicles. Then the number of barges required will be 1,100, and when reserve and replacement stores, ammunition and petrol, etc., are added, say—1,500.

Then I wrote :

> "In spite of German efficiency and thoroughness, to marshal such a fleet—and throughout my figures have been conservative—to embark the force in order of disembarkation, to move it across the sea—a tremendous target to air attack—at a speed of not more than eight knots in face of the most powerful navy in the world, is certainly a problem.
>
> . . . . .
>
> "To over-run Poland in three weeks—not in one—the Germans are reported to have put into the field not a paltry 100,000 men, but the following forces :
>
> Fifty-seven infantry divisions.
> Five motorized divisions.
> Five armoured divisions.

Four light mechanized divisions.

One cavalry brigade and one tank regiment per corps, without counting aircraft.

"Should any of my readers care to work out in barges or flat-bottomed boats what such a horde of armed men would require to ferry it across the Channel, I shall be delighted to receive their answers, and also, I have no doubt will the Astronomer Royal."

From these few figures, and all are on an extremely conservative basis, it will be seen what a vast amount of shipping is required for an invasion on the grand scale. Nevertheless, supposing that the Germans can collect it, it is as well to consider what form such an invasion is likely to take. Though air-borne troops will certainly play a prominent part, in my opinion it cannot be a decisive one, because they will be almost completely unmechanized and unmotorized. Further, the difficulties in supplying them are so great that their endurance as fighting men is strictly limited. They are in fact nothing more than air-borne guerillas, an advanced guard of confusion mongers, under cover of which the invasion proper will be attempted. This operation must be carried out by sea and not by air-borne troops. The key problem is, therefore, the seizure of well-equipped enemy ports. In turn, this means that these ports should face narrow seas—that is, restricted areas of water in which the vastly superior British fleet will have little room to manœuvre; for warships, like pugilists, require "foot-room."

Such exist in two quadrilaterals of water—namely, Dover-Calais–Cherbourg–Isle of Wight, and Belfast–Port Patrick–Wexford–Milford Haven. In the second are to be found all Great Britain's western ports south of Glasgow and north of Bristol, and in the first—Dover, Folkestone, Newhaven, Portsmouth and Southampton. It would seem, therefore, that, if the Germans really intend to invade Great Britain, one of these two quadrilaterals will have to be gained, consequently the next question is—"how?"

The answer is governed by the word "surprise," for unless one or more of the main landings can come as a surprise, the chances of success will drop to zero.

As all possible landing places will most certainly be held, and as all the enemy's points of embarkation will most certainly be known, so far as I can see the sole possibility of surprising the British garrisons is to distract their attention by a series of preliminary invasions on far-separated stretches of coast, accompanied by air-borne troops.

As the aim of these raiding forces will be to create pandemonium

and not win decisions, and as they will be small in size, the points of landing they are likely to select are islands, promontories or narrow strips of land which they can hold defensively, such as the Isle of Wight, the Isle of Man, the area between the Firth of Tay and Forth, Thanet Western Cornwall, the area round Wexford and the Mull of Kintyre.

Next comes the main problem and the real difficulty—namely, how in the minimum of time and under cover of these distracting operations are the Germans going to rush into one of the two above-mentioned areas forces sufficiently large and well-equipped to stand a chance of establishing a bridgehead.

It seems to me that the tactics they are likely to adopt will closely resemble those of crowning the heights in mountain warfare. That is to say, an attempt will be made to establish two defensive walls rising upwards from the bottom of the sea to, say, 30,000 feet into the air, each flanking a sea lane down which the invading forces will move :

(1) For the under-water wall—submarines and mines.
(2) For the surface wall—speed boats and smoke.
(3) For the over-water wall—aircraft.

It is therefore just possible to imagine that, if the preliminary invading forces are pre-eminently successful, the main invading forces might be able to secure one or more landing stages. Nevertheless, how in face of an undefeated British navy and air force they are to keep open their sea communications for at least several weeks, is beyond my comprehension. Yet there can be little doubt that Marshal Goering, in command of the German Air Force, did believe that not only was it possible to gain air command over Great Britain—a rational belief—but that when this had been accomplished the road to invasion would be cleared, which in my opinion was and still remains an irrational one.

The German air attacks against Great Britain, which followed close to heel on the collapse of France, may be divided into three overlapping operations :

(1) The gaining of air command over the Channel.
(2) The paralysation of London.
(3) The destruction of British seaports and industrial centres.

The first opened with the bombing of Jersey and Guernsey on June 28, and led to the German occupation of those islands. Nevertheless, it was not until August 11 that a decisive effort was made to win the air over the Channel by mass attacks, all of which ended in complete failure, the Germans, according to the British Official

Reports, losing 493 aircraft to the British 115 during the week August 11–17, and 293 to 113 during that of August 25–31.

Though London was first bombed on August 24, it was not until September 7 that the main attack was launched and to be kept up throughout the winter and well into the following spring. Though the damage done was extensive and widespread, the fact remains that the target was too large to be annihilated. Even if three or four times as many machines had been used as were actually employed in this destructive work, it is more than doubtful that the morale of London would have cracked.

In the case of the third operation—namely, the bombing of ports and industrial cities—targets were smaller and destructive work could be concentrated on restricted areas.

On the whole, however, bombing, whether by day or by night, fell far short of the expectations of air theorists. Though thousands of tons of bombs were dropped upon London and other cities, no single one was permanently put out of action. The worst effect, in my opinion, of all these operations was that they awakened in England a totally irrational demand for reprisals, and a general cry went up of "Bomb Berlin!"

Two things were overlooked—namely:

(1) That the bombing of London ended in failure.

(2) That, whereas London is within 100 miles of the German airfields in France, Berlin is over 600 miles from those in England.

What the bombing-maniacs could not see was that, *vis-à-vis* Germany, Great Britain is exceptionally badly placed as regards bombing, not only because Germany and the countries she has occupied cover a far greater area, but because the German airfields stretching as they do in a semi-circle around Great Britain, enable concentric bombing to be brought to bear on her. Conversely, all British bombing against Germany and the countries she has occupied is perforce eccentric.

As this is so, it is obvious that Great Britain's main air problem is a defensive and not an offensive one. That is, a problem based on the fighting and not the bombing machine. If the Germans really intended to invade Great Britain during August and September, 1940, and if they really believed that their bombing machines could pave the way, then it was the British fighter and not the British bomber which defeated them. Except for the bombing of their enemy's ports and shipping, I consider that all the other German air attacks ended in all but complete failure; consequently I also consider that, until Germany is approaching a state of economic collapse, the British bombing of her cities will only end in accentuating that fact. This does not mean that

bombing of industrial centres is useless, but that the idea behind the present form of air bombardments should be changed. It should be to stop work and not mainly to destroy life and property. Thus I maintain that a continuous stream of small raids kept up over a long period on a fixed number of targets is likely to prove more effective than spasmodic full-scale attacks on the same. Tactics are an art and not a mere bout of fisticuffs, and in war the tactical object of this art is disorganization and not destruction. Though "killing Germans" sounds very brave and forthright, more especially so when the battlefield is Fleet Street, stopping Germans from working is far more effective. This becomes clearly apparent when it is realized that ninety per cent of war depends on working and ten per cent only on fighting.

Chapter XVI

THE INDIRECT APPROACH, FIRST PHASE

THE FAILURE OF THE DIRECT ATTACK ON GREAT BRITAIN COMPELLED Hitler to turn towards the East. If he could not gain command of the English Channel or the North Sea, and if he could not occupy Ireland, an invasion of the British Isles was not a practical operation of war. Therefore strategy dictated that his next best course was to strike at British naval power in the Mediterranean, which he could only do by occupying its bases, which in turn meant driving the British land forces out of Egypt and Palestine. Were this done, then not only would British loss of prestige be catastrophic, but by opening the Mediterranean to Axis trade a telling blow would be struck against his enemy's blockade.

In this indirect approach he was greatly assisted by the collapse of France, for not only was the French navy now out of the way, but in Libya the Italians under Marshal Graziani were relieved of the threat of an attack in rear from Tunisia ; also their communications with Italy were vastly improved. Conversely, the British army in Egypt and Palestine was now not only more powerfully threatened from Libya, but also potentially so from Syria, and as its supply line had recently been switched to the Cape of Good Hope route, administratively it was placed in an exceedingly difficult position. Further still, the more the British were compelled to divert shipping to the East, the less ships would they be able to

use on the Atlantic supply routes. Therefore a campaign in the East would not only under-cut the British blockade, but also directly assist the German counter-blockade of Great Britain.

When Italy entered the war, the Italian army in Libya numbered in all some 250,000 officers and men, numerically a formidable force, but actually a weak one, because not only was it largely unmechanized, but the tanks it possessed were, probably, the most indifferent in Europe. In 1935–1936, when with the Italians in Abyssinia, I had come to the conclusion (see my *First of the League Wars*) that, though they were the world's best navvies, as soldiers they were indifferent. True, the Alpini regiments were sturdy mountain troops, and some of the Bersagliere were soldierlike, but taken as a whole the line conscripts and the Black Shirt Militia were of very poor quality and indifferently trained.

On September 13, 1940, Graziani set out and occupied the Egyptian frontier post of Sollum. From there he pushed on to Sidi Barrani, where he halted, throwing forward his outposts a few miles to the east of it. From then onwards he did nothing outside fortifying his position and constructing a line of entrenched camps stretching southwards into the desert, the southernmost of which was Bir Sofafi, twenty-five miles south-south-west of Sidi Barrani and separated from those to the north of it by a considerable gap.

Leaving three divisions in Tripoli, Graziani appears to have carried forward with him some ten divisions as well as General Maletti's armoured formation. These he distributed as follows: the 1st Libyan Division to hold Mekili; the 2nd Libyan Division to garrison the entrenched camps with the 63rd Metropolitan Division at Bir Sofafi; the 3rd of January Blackshirt Division to garrison Sidi Barrani; four divisions—the 62nd and 64th and two Blackshirt—at Sollum and Bardia, and two divisions at Tobruk. In all, some 140,000 officers and men.

Graziani, who was reputed to be a thruster, was in fact nothing of the kind. In Somaliland, during the Italo-Abyssinian war, he had delayed and delayed his advance, now he did so again and this time to his ruin. His tactics were ultra-cautious and poles apart from the *guerra di rapido corso* which Mussolini had proclaimed.

Meanwhile the Germans set out to occupy Rumania, and by the end of October had firmly established themselves in that country. Then, suddenly, on the 28th of that month Mussolini presented an ultimatum to Greece, demanding the occupation of certain strategic points; whereupon, on it being rejected, he ordered his troops in Albania to cross the Greek frontier. Thus he inaugurated the as yet greatest fiasco of the war.

That this campaign was launched without Hitler's consent is improbable, as it comfortably fitted into the strategy then taking

form ; for now that Germany had a grip on Hungary and Rumania, it was obviously of importance to prevent the British establishing air bases in Greece, because were they to do so they would be in a position to bomb the Rumanian oil fields as well as the Danube communications. Further, I think it is beyond doubt that both Hitler and Mussolini were of opinion that Greece would submit without fighting. Yet the upshot was that no sooner did the Italians advance than they were driven back, consequently the result was diametrically the opposite to the one intended. Instead of keeping the British out of Greece it opened the door to them, and on November 3 it was officially announced that British forces had landed in Greece and on the following day that they had also occupied Crete.

This failure, which carried with it a prodigious loss of Italian prestige, roused the British to action and led to the launching of their first Libyan campaign in December, a campaign of peculiar interest, if only because it was the first considerable tank operation carried out since the close of the last war by the inventors of that machine.

To begin with, and as is not uncommon in British history, the forces in Egypt under General Sir Archibald Wavell were inadequate to carry out a sustained campaign of any size. This is clearly proved by the fact that in no single engagement was he in a position to put into the field more than two divisions, or about 30,000 men in all. Further, it would seem that he never intended to carry out more than an extensive local operation, the idea behind it being, not to over-run Cyrenaica, let alone Tripolitania, but solely to push the Italians back from the Egyptian frontier. For such an operation he was well placed, because his Army of the Nile was based on the entrenched camp of Mersa Matruh, which was linked by rail to Alexandria. Besides, the right flank of that army was secured by the British naval command of the Eastern Mediterranean.

In brief, the British plan of attack was as follows :

Under cover of naval and air force bombardments to drive an armoured force through the gap in the Italian defences which stretched between Bir Sofafi and the forts to the north of it, and cut Sidi Barrani off from Sollum. This force to be followed by a Motorized Division which would attack the Italian forts in rear.

On the night of December 7 the Armoured Force in dispersed order, so as to reduce likelihood of being observed, moved towards the gap. Then, on the following day, the Motorized Division moved westwards as if to attack Bir Sofafi. As night fell both wheeled northwards, and on the morning of the 9th, while the Armoured Force pushed on to Buq-Buq, from where it turned eastwards to attack Sidi Barrani in rear, the Motorized Division, sup-

ported by a group of tanks, forced the surrender of the entrenched camps. Sidi Barrani capitulated on the 10th, thereupon the Armoured Force turned westwards and, on the following day, had the good fortune to come into a heads-on collision with the 64th Italian Division, then on its way to relieve Sidi Barrani. Thus confronted by a force it could not fight, the 64th surrendered.

Rightly did Marshal Graziani attribute his defeat to the overwhelming superiority of the British tanks. How superior they were is clearly illustrated by the respective casualties. Whereas the Italians lost some 40,000 in killed, wounded and prisoners, the British losses stood at 72 killed and 738 wounded.[1]

Between the 15th and 17th the Italian forts along the frontier were captured, and on the 23rd the bombardment of Bardia was opened. On January 5 its garrison—over 2,000 officers and 43,000 men—capitulated. The cost to the British was under 600 in killed and wounded.

It was now that a blunder of the first order was made by the British Government. Some time previously Italian forces had crossed the Sudan-Eritrean frontier and had occupied the British post of Kassala, which lies some 250 miles to the east of Khartum. Rightly, in my opinion, it was re-occupied by the British on January 18; but wrongly this operation was followed up by the invasion of Eritrea. Surely it would have been wiser to have finished off with the Italians in Libya before embarking on the conquest of Abyssinia, the occupation of which in any case could be no more than a liability? Strategy was, however, thrown to the winds, and thereby the Libyan campaign was ruined. Not immediately, but, instead, a few months later, as we shall see.

Meanwhile in Cyrenaica the British pushed on. On the 22nd Tobruk fell and with it 25,000 prisoners passed into British hands at a cost of under 500 casualties. On the 30th Derna fell, and six days later the Battle of Beda Fumm was won. It led to the British occupation of Benghazi and the termination of the campaign.

This battle is of peculiar interest, because in dramatic form it once again proved the irresistible superiority of a well-organized and skilfully led mechanized force.

Once Derna was occupied, the British tank regiments were concentrated at Mekili on the desert track which runs from Tobruk to Benghazi, while the motorized troops followed the coast road to Cyrene, which is bent like a bow to the former's string. When by

[1] The normal proportion of killed to wounded is one to four or five. Why in this battle it stood at one to ten I do not know, though in the First World War for Tank Corps casualties the figures stood at 12.58 per cent killed to 70.-4 per cent wounded.

air reconnaissance it was discovered that the Italians were in full retreat, the British Command decided to head them off by pushing forward the tanks at Mekili across the desert to the Gulf of Sirte, while the motorized troops continued the direct pursuit. This bold manœuvre was eminently successful. On the afternoon of February 5, the van of the Mekili force composed of light tanks struck the coastal road nearby the well of Beda Fumm, some sixty miles south of Benghazi, and at the very moment when the head of an Italian column came into sight. Before that column could deploy it was surrounded and destroyed. Then night fell and the first phase of the battle ended.

At dawn the next day the second phase was opened by the Italians bringing up some seventy medium tanks, when the British medium machines also coming on to the field, a tank *versus* tank engagement was fought. It was rapidly decided by the superior gunnery of the British, forty-four of the Italian tanks being knocked out. At dawn on the 7th the surviving Italian machines failing to break through their enemy, the white flag was hoisted and 15,000 Italians under General Cona laid down their arms, some 2,000 having been killed and wounded in the attack. Pushing on to El Agheila, the British established there their most westerly post, and the second Libyan campaign came to an end.

Though little of a reliable nature has been written on the tank tactics employed by both sides, the outstanding lesson of this campaign is once again the triumph of machine power over man power as well as of skill over numbers. From start to finish the Italians were doomed, not because they were indifferent soldiers, but because, even had they been the best, they could not have stood for long against the superiority of metal the British were able to put into the field. Because of this superiority the battles fought were in character surrenders rather than fights, the British casualties being insignificant when compared to the number of prisoners made—in all 140,000.

From the point of view of machine war, the next campaign, launched by the Germans against Yugoslavia and Greece on April 6, was an even more astonishing one. It is all but a certainty that Herr Hitler had expected a peaceful occupation of the first of these two countries, followed by the immediate submission of the second, and that, therefore, his plans were unduly upset by the *coup d'état* which on March 27 placed an anti-German Government into power at Belgrade. Nevertheless, though on the 6th the German troops were far from being soundly distributed for an invasion, speed and surprise once again cancelled out all strategical deficits.

Considering that both Yugoslavia and Greece are mountainous

countries and that their communications are some of the poorest in Europe, the rapidity of the German advance exceeded even that accomplished in Holland. On the 13th Belgrade was occupied, on the 15th—Serajevo, and on the 18th the Yugoslav main armies capitulated. Thus, in twelve days, a country seven and a half times the size of Holland and in appearance impregnable to war machines, had collapsed into ruin. Nor did Greece long survive its fall, for though a British Expeditionary Force had come to her assistance, apparently under the assumption that Yugoslavia would prove so hard a nut to crack that ample time would be provided wherein to establish a strong defensive position north of Larissa to the Albanian border, Salonika was occupied by the Germans on the 9th, and by the 21st the Greek situation was so critical that the British began to withdraw. On the 23rd King George of Greece transferred his Government to Crete, and four days later the Germans occupied Athens.

As regards the German tactics, Wilhelm Necker writes:

> "A Yugoslav officer reported from Athens on April 14th, 1941, that artillery positions were attacked by waves of dive-bombers. 'When they had finished their work, troop-carrying planes came over in hundreds, dropping parachutists armed with machine-guns, who took up positions behind rallying Yugoslav troops and opened up intensive fire.
>
> " 'Parachutists were also dropped on top of the forts and set about the task of hurling explosives through the casemates and blowing in the entrances. Most of the parachutists were wiped out finally, but they had accomplished their work.
>
> " 'When motor cyclists, cars loaded with well-armed troops and tanks roared down the mountain roads, arriving at the Yugoslav defences according to time-table, they found the opposition largely silenced and were able to halt, remove road obstacles, and deal with the defenders still contending with the surviving parachutists.' 'Once the first line was overcome, the process was repeated again and again deeper into Yugoslav territory. Units left behind cleared the way for advancing motorized troops and the artillery needed for pounding the fortified passes ahead, laying telephone lines, and so forth.' "

Synchronizing with this lightning campaign came another—namely, the German reconquest of Libya. It might and should have been expected, because, as early as February 26, a skirmish between British and German mechanized units had occurred at El Agheila, a hundred and seventy-five miles south of Benghazi, but apparently nothing ominous was deduced from this, outside the obvious fact

that the Germans had reinforced the Italians in order to stay them up against any further withdrawals.

No doubt this was the case, yet the British, in spite of the many examples the war had already afforded them, should have realized that German tactics are not based upon holding operations, but instead upon hitting. Therefore the mere presence of German tanks should have warned them what was in the air. So it came about that once again a thunderbolt flashed out of the blue. On March 31 another skirmish was fought at El Agheila, which on the following day led to the British outposts withdrawing. Nothing further was reported until April 3, when to the consternation of the world in general it was learnt that German mechanized units under General Rommel had occupied Benghazi and that the British Cyrenaica garrison was in full retreat. On the 12th Bardia was in German hands. Thus in fifteen days General Wavell's sixty-day Libyan campaign was unravelled.

So far as I can discover, for the details of this campaign are still obscure, a German mechanized force of some hundred and fifty machines, surprised and routed the British Cyrenaica armoured brigade at Mersa Brega, and then pushed on after its remnants to Agedabia. From there, meeting with no opposition, it advanced on to Benghazi which was held by a British division. On the German approach that division fell back on Tobruk with the Germans close to heel, and having gained the Tobruk fortifications the Germans merely masked them and then passed on to Bardia and Sollum.

What is worth noting in this small desert campaign is that, whereas in General Wavell's much stress was laid on the British superiority both at sea and in the air, in Rommel's the Germans were in no way assisted by warships, and in the air they were from start to finish inferior to their enemy. My own opinion is that when an audaciously led force of tanks surprises its enemy, unless an equally audaciously led force can be pushed forward to meet it, the circuit of action of the surpriser is limited only by the wear and tear of his machines and the ability to keep them supplied. In such operations, though warships and a superiority in aircraft are of undoubted assistance, their co-operation is secondary to the factors of surprise and speed of movement. If the speed of a mechanized force, large or small, can be maintained at an average of forty or fifty miles a day, so great is the consternation and confusion engendered that in importance all other things dwindle almost to vanishing point. In fact, velocity itself has become a "weapon." A weapon which can only be countered by its like—a lightning withdrawal to avoid a lightning advance, or else a lightning counter-attack.

Rapid and skilful as were the campaigns of General Wavell and

General Rommel, the final campaign of this phase of the war was the most astonishing of them all. I refer to the successful German invasion of Crete, so far a unique military operation and therefore difficult to assess.

Measured by theory alone, the invasion of a strongly garrisoned island would not be considered a practical operation of war unless it came as a complete surprise, and then only as a pure gamble. Yet in the invasion of Crete surprise was out of the question, consequently it stands in a category apart from the air invasions of Norway and Holland, which in any case would probably have failed had not those countries been simultaneously invaded, the one by sea and the other by land. The whole event is really so remarkable that, until more information is available, it is difficult to understand how it came about in the face of a stubborn enemy operating in country of a pronouncedly defensive character.

The strategic value of Crete was recognized by the British from the very moment the Italo-Greek war opened, hence the despatch of a British garrison there on or before November 3. Blocking the mouth of the Aegean, the island overlooks southern Greece, and with Cyprus—350 miles eastwards of it—it commands the Turkish Mediterranean shore. Further, as it is less than 250 miles from Libya and Western Egypt, it flanks the western approach into the Eastern Mediterranean, and consequently stands sentinel over Egypt and Palestine.

The island itself is about 160 miles long and from 30 to 50 in width. Its western extremity is no more than 60 miles from the Morea, and its eastern but a little more than that from Rhodes. The greater part of its terrain is hilly and mountainous, roads are few and indifferent, and the only good harbour is Suda Bay. Suitable ground for airfields is exceedingly restricted, except at Maleme and Erakleion. What the actual strength of the Greek and British garrison was has not as yet been published; probably somewhere between thirty and forty thousand officers and men, and though it was lacking in heavy equipment, on the ground at least it was more powerfully armed and equipped than any air-borne invader could possibly be.

Mr. Churchill had very rightly proclaimed that Crete was to be defended "to the death," which obviously meant—defended against air attack, because, in face of the British naval command of the Mediterranean, a sea invasion of any importance was out of the question. This was proved during the operations, for of the two small sea invasions attempted, one was smashed up and the other dispersed. This being so, it should have been obvious that air success depended solely on the ability of the Germans occupying the Cretan airfields; therefore it was essential either that they

should be held at all costs or rendered impracticable for aircraft to land on. Neither course was adopted. Instead, shortly after the German air bombardment opened on May 18, to be intensified on the 19th, practically all British aircraft were withdrawn to Egypt, and thus the garrison was tactically beheaded. Though in the circumstances this was probably unavoidable, what remains unexplained is: Why were not preparations at once put into hand to defend the airfields against vertical attack? My provisional answer is: Because the British Command continued to think horizontally.

The defence of an aerodrome against air attack, even when anti-aircraft guns are limited in number and fighter aircraft altogether absent, is not, in my opinion, an insuperable task. It consists in drawing a belt of small well-spaced works round the perimeter of the landing ground from which concentric fire can be brought to bear on it. Next, by protecting this belt by an outer ring of works, so sited that eccentric fire may be delivered from them—that is, fire outwards instead of inwards. The two together constitute the old siege problem of circumvallation and contravallation; therefore there is nothing new in this defence. Had it been adopted, the garrison could well have provided the men, as there were only three aerodromes on the island, and still have held large forces in hand to reinforce them or for other duties, such as coastal defence. In this respect, however, nothing it would appear was done.

What was the result? Early on the 20th, under cover of dive-bomber attacks, several thousand parachutists were dropped in the neighbourhood of the objectives selected, not to occupy them, but instead to prevent them from being occupied. Though most of these heroic men were rounded up or killed, they gained sufficient footings to enable the air invasion proper to proceed.

On this day the German objectives appear to have been: the occupation of the Akrotiri peninsula, north-east of Khania, which overlooks Suda Bay; Khania and the airfield of Maleme to the south-west of it; Rethymnon, and Erakleion and its airfield.

The means of transportation employed were troop-carriers and gliders, which is fully explained by an Australian Correspondent in his despatch to *The Times* on May 31, one of the most illuminating I have so far read on any operation. In it we read:

> "Instead of taking the attitude that each aeroplane is a valuable weapon, not to be broken if possible, the Germans have used it as a mere means of getting somewhere. They have built large numbers of cheap, light, and inexpensive Junkers, that can carry 40 men. Instead of trying to preserve these aircraft for further use, the Germans say: 'Get the men there;

crash the aeroplane ; put it down where you like ; but get the men there.' On this basis they have put hundreds of aircraft down all over Crete—in tree-tops, on mountain sides, in the sea, on the beaches, and even in the villages.

". . . The moment the German troops got a foothold it was these Junkers that crash-landed with fully armed troops. They are the key to the whole thing. . . ."

In addition were used gliders and sea-plane gliders. "A big four-engined Focke-Wulf aeroplane, towing about 10 gliders, spaced 200 ft. apart, released all the gliders at once, which in turn were automatically released from each other"—each carrying a maximum of 16 armed men.

By these means and after, so it would appear, intense fighting, the Germans obtained such a hold on the island that on May 29 the British decided to abandon it. This they did, saving in all some 17,000 men at a naval loss of three cruisers, one anti-aircraft cruiser and six destroyers.

The lessons of this remarkable operation are most instructive. First and foremostly it showed that when air power is given a free hand the horizontal defence is no match against vertical attack, and therefore that two-dimensional tactics are now outclassed. An unmechanized army without adequate air support is no longer in the true meaning of the words a fighting force, and a fleet caught by land-based aircraft in narrow waters is placed in a death-trap. Of the German tactics *The Times* Australian Correspondent wrote :

"Knowing that there would be little British fighter opposition," the Germans sent over large formations escorted by fighters. "These did not drop all their load at once. They had a route like a city bus. They raked the island from one end to the other with bombs, and if there were no British fighters near, the Messerschmitts swept on to further objectives, strafing the British land positions.

"To augment their activity both in the air and on the land, the Germans had standing reconnaissances over Crete for 24 hours a day. . . .

"Never has wireless been used to such an extent as in Crete to control manœuvres. Contact between land forces and aircraft reconnoitring or bombing above them, was continuous. The land commander could order out one of a bomber formation to assist him if he needed bomber assistance immediately. He could ask one of the standing reconnaissance aircraft above him where and what the British were doing and get a reply immediately.

"These are the incredible and complete methods of totalitarian air war organized to the *n*th degree. . . .

"For any army to defeat this modern ruthless German army it must be equally ruthless, equally scientific, and equally well equipped."

Finally, the most staggering fact about this invasion is the ruthlessness with which the German Command sacrificed its men to the end in view. That the entire suppression of human instincts and emotions is necessary if machine warfare is to be brought to its highest pitch of perfection is no doubt true. Nevertheless, I cannot help feeling that it is lamentable, and that it bodes no good to the world should such a suppression be carried over from war into peace. Man is not a robot, therefore he should not be looked upon as a mere projectile—a human bullet. Yet machine warfare demands that this shall be, and thus challenges the age-old conceptions upon which the human world order has been founded. This is perhaps the most perturbing lesson Crete has to teach us.

Chapter XVII

THE INDIRECT APPROACH, SECOND PHASE

CRETE CONQUERED, WHAT WOULD HITLER NEXT ATTEMPT? THIS question was on every lip.

In Northern Africa the campaigning season was over until the autumn. In Iraq the rebellion of Rashid Ali had been brought to an end and British troops were now established in Mosul. On June 8, in order to put a stop to German intrigues in Syria, British forces had crossed the Syrian frontier, soon to become engaged with their former allies the French. Ten days later a Treaty of Friendship was signed by Turkey and Germany in Ankara. Then, suddenly, at dawn on the 22nd the question everyone had been asking was answered. Germany invaded Russia. Whereupon the British Empire became an ally of the U.S.S.R., the U.S.A. backing both.

Why this sudden wheel-about? Did it mean a radical change in Hitler's war policy? No, instead, its logical continuation.

Hitler's problem still remained how to get at England. Not

being able to invade her he had turned East, but there again sea power stood in his way, and his sole means of fighting was to strike at the British naval bases in the Eastern Mediterranean. The direct road of approach ran through Turkey, and I have no doubt in my own mind that he would have taken it had he been certain of Stalin.

By line of march Cairo is some 1,500 miles distant from the Bosphorus, and Anatolia is largely a roadless and railless country and by no means an easy one to campaign in. To supply a large army in Anatolia would be difficult, and hundreds of thousands of men would be required to maintain and protect its communications. As bad, its European communications through the Balkans would run at right angles to Russia; therefore, should Stalin suddenly change sides, the Germans would find themselves in the predicament of having to face two fronts. Consequently Hitler decided, and strategically he was right, that as in no set of circumstances was Turkey likely to support Russia, and that as in almost any set Russia was likely to support Turkey were he to invade that country and get involved in Anatolia, his correct course of action was to rid himself of the Russian threat before proceeding further East.

That Germany and Russia were in alliance has, I think, little to do with the question, for on both sides their pact was purely a *traité de convenance*. Stalin feared the efficiency of Germany and realized that, in spite of its numerical superiority, the Russian Army was incapable of meeting the German in the field on anything approaching equal terms. Further, he feared war for its own sake, because he could not trust his army under any but yes-men. This was at least one of the reasons for his frantic purges of 1937 and 1938, in which, according to Krivitsky (see *I was Stalin's Agent*), 35,000 members of the Officers' Corps were executed. "The frightfulness reached such a point," writes Krivitsky, "that Stalin, to save himself, had to execute his executioner (Yezhov)." And again: "the Soviet Government became one gigantic madhouse. . . . Everyone was a traitor, until he proved the contrary by exposing someone else as a traitor."

Hitler's outlook was otherwise. He did not fear war with Russia, but what he did fear was a war on two fronts, such as led to Germany's collapse in 1914–1918. Never again did he intend that his country should be placed in such a predicament; therefore he was willing to reverse his policy in order to avoid such a conflict. This decision was, I understand, arrived at shortly after the signing of the Munich Pact, with the result that, on January 12, 1939, "there took place before the entire diplomatic corps in Berlin the cordial and demonstrative chat of Hitler with the new Soviet Ambassador."

Lastly, came the official announcement of the signing of the Soviet-German Pact on August 23.

In fact this Pact meant no more than that on the one side Stalin hoped to avoid war with Germany until she was so weakened or involved that his army could intervene as a revolutionary rather than as a military force. Whereas, on the other, Hitler intended to keep Russia out of the war until such time as his armies were free to turn on her.

Unexpected though Hitler's blow undoubtedly was, Stalin's position was by no means so desperate a one as had faced Norway, Holland, Belgium, France, Yugoslavia and Greece, because not only were the Russian military forces numerically stronger than the German, but they were even more powerfully mechanized. They certainly outnumbered them in tanks, probably, also in aircraft, though many of the Russian machines were verging on obsolescence. Their weakness did not lie in either lack of numbers or in inferiority of equipment, but instead in generalship. The purge of 1937–1938, like the sword of Damocles, was now to fall on Stalin's head; for when on June 22 its thread was severed, there was not a single soldier of eminence left to direct the Russian armies as a whole.

In challenging this formidable yet headless army I am of opinion that Hitler knew exactly what he was doing, because for years past the German General Staff had minutely studied both Russia and the Russian army. A case in point came to my notice early in 1939. I happened to be visiting Berlin, when a Swedish friend asked me whether I would like to see the Contra-Comintern Office, a department which collected information on Russia. Answering "yes," I was taken there, to find that in it were stored thousands of files on every conceivable Soviet subject. While chatting, an official turned to me and said: "Would you like to see the file on yourself?" "On myself," I answered incredulously, and the file was handed to me. It contained hundreds of cuttings from Russian newspapers and reviews on my military writings. Turning to my friend, I asked: "What is all this for?" And his reply was: "Everything concerning Russia is studied. These files are not scrap books. Instead, they are the raw materials out of which plans are built."

If in his invasion of Russia Hitler has made a mistake, then I suspect it to be primarily a psychological one. Possibly he reckoned on a counter-revolution. If so, he has been disappointed, for when a politically divided nation is attacked, the rule is that nothing obliterates division so speedily as a common danger. If Hitler reckoned on an anti-Bolshevist rising, then he certainly blundered, because his enemy were Russians first and only secondly Bolsheviks and anti-Bolsheviks.

The theatre of war had also been closely studied by the German General Staff, and though undoubtedly it was realized that, as in previous wars, its immensity remained a factor of vast defensive importance, it must also have been realized that it was not its great depth which was now of first consideration, but instead its industrial resources. This could not have escaped them, because in machine warfare it is coal, oil, iron and the industries springing from them which are vital to the maintenance of machine armies in the field. Whereas in the days of Napoleon it was leagues which had to be reckoned with, to-day it is raw material and manufactures. If the Russians could be deprived of these, their armies would be metallurgically and minerally starved out.

Whatever may be our opinion of Bolshevism, Communism or State Capitalism, or by whatever other name the Russian way of life is called, there can be no question that, from the purely economic point of view, it has been an unqualified success. Even the following table indicates this clearly :

Raw Materials	Output in Million Tons				
	1913	1928	1932	1937	1940
Coal . .	29	35	64	128	170
Iron . .	4	4	6·2	14·5	16·8
Steel . .	4	4	5·9	16·8	19·7

In this table it is interesting to note that, as 1913 was the last pre-war year of the Tsarist regime, 1928 was the last year prior to the 1st Five Years Plan, which was completed in four years—that is, in 1932. 1937 was the last year of the 2nd Five Years Plan, and 1940, therefore, the third year of the 3rd Five Years Plan, which aimed at producing 240,000,000 tons of coal, 22,000,000 tons of iron, and 28,000,000 of steel in 1942.

There can be no doubt whatever that this stupendous leap forward in industrialization changed the entire economic relationships between Germany and Russia. So long as Russia remained essentially an agricultural and non-industrial country, the military threat to Germany was slight. But, once the Bolshevik economic order caught hold, it was quite obvious that at no very distant date German industries and with them Germany's war potentials would be outpaced. In short, because of Russia's industrial challenge, a clash between her and Germany was as inevitable as prior to the First World War a clash between Germany and Great Britain was on account of the expansion of German naval power. In 1914 Great Britain went to war with Germany because she would not

tolerate a naval rival. In 1941 Germany went to war with Russia because she would not tolerate an industrial rival, which in turn meant a military rival. Substitute land power for sea power and the objects of both these wars are identical.

As this was so, it logically followed that, whereas Germany's grand tactical aim would and must remain the annihilation of the Russian armies, her strategical objective would be the annihilation of Russia's industrial power, in order to undermine not only the fighting strength of her armies, but also her life, which on account of the three Five Years Plans had become more and more dependent upon machine power. Thus, for instance, her agriculture was daily becoming more and more dependent upon tractors. In 1940 no less than 523,000 were in use.

Though, during the last twelve years, great industrial centres had been opened up in Asiatic Russia, the more important still remained west of the Ural Mountains and were grouped around Leningrad, Moscow and in the Donetz Basin. They were, therefore, comparatively speaking, within easy reach of Germany. Still more important, however, were the Russian oil fields, which constituted the "power-house" of both Russia's agricultural and military strength. These oil fields may be grouped as follows:

(1) The Caucasian, north and south of the Caucasus, with an outpost at Krasnovodsk, on the eastern shore of the Caspian.

(2) The wells north of the Caspian between the lower Ural and Emba rivers.

(3) The oil fields on the Byelaya river east of Kubishev and 700 miles east of Moscow.

Of these three groups the first is out and out the more important, because it produces ninety per cent of Russia's total output, and of this ninety per cent seventy per cent is drawn from the Baku wells, which are the most prolific in the world. There also are to be found Russia's largest refineries, and from Baku two pipelines run to Batum, and from Makhach-Kala, north of Baku, yet another to Tuapse, on the Black Sea, and to Rostov on the Don.

This area, stretching between the Araxes river in the south and the lower Don and lower Volga, roughly the quadrilateral Baku-Bakum-Astrakhan-Rostov, is Russia measured not in miles, but in barrels of oil.

Second only in importance to the Baku oil fields are those in Iraq and Persia, which are vital to Great Britain. Therefore could the German armies occupy Caucasia they would be well placed to operate against those fields. Consequently, by enlarging the above quadrilateral to Astrakhan-Teheran-Bandar Sharpur (Basra)-Aleppo we arrive at the true strategic or power centre of the war,

an area in which a German success would mean the almost certain collapse of Russia and the probable collapse of Great Britain as well, because should its occupation lead to a German conquest of the Near East, not only would the British Empire be cut in half, but British prestige would sink to zero.

Five months after the war opened and long before the German attack on France was launched, I came to the conclusion[1] that the most profitable battlefield for the Franco-British land forces was to be sought not on the Western Front, but in the above-mentioned quadrilateral. Even after the fall of France and the entrance of Italy into the war, I held to this idea, and in an article entitled "Attack! Attack! But Where?" which no editor would look at, I wrote:

> "Our course is simple, though difficult. Our enemy's fighting strength on land, in the air and on the sea pivots on one factor above all other factors—oil! *Our Army must cut off his supply.*
>
> "Where does it come from? Outside his home synthetic production and Rumania, it comes from the U.S.S.R. The annual output from Rumania is 7,500,000 tons and from the U.S.S.R.—28,000,000. *Therefore we should strike at the second.*
>
> . . .
>
> "We can base our Army on the Persian Gulf. We can supply it by way of the Cape, should the Mediterranean be closed to us, also from India. And in its immediate vicinity there lie the Persian and Iraqi oil fields, which can provide it with 15,000,000 tons of oil a year."

I have no doubt now that our means were then insufficient for such a campaign; but this was not the main objection to the idea. Instead it was that though Russia was in alliance with Germany she was neutral to Great Britain. Yet I was pretty well certain that the surest way to break that alliance was to threaten Russia, because I could not help feeling that Stalin would never allow the Germans to cross the Russian frontier, as they would have insisted upon doing had we marched on the Caucasian oilfields.

Whether I am right in supposing that those fields are Germany's ultimate aim, or whether her objective is somewhere else, in no way alters the German tactical objective, which must be the overthrow of Russia's fighting strength. This brings us to that form of strategy which deals with communications and bases instead of resources civil and military.

[1] See *The Weekly Review*, February 8, 1940

In this particular strategic field there are four vital centres or areas :

(1) Leningrad, not only because it is Russia's Baltic mouth, but because it stands, like a great bastion protecting the ports of Murmansk and Archangel. It is linked to the first by rail and by the White Sea Canal, and to the second also by that canal and the railway which runs via Vologda : Murmansk and Archangel have access to the Atlantic.

(2) Vladivostok, Russia's Pacific mouth, I need not touch upon, as it is outside German range.

(3) Odessa, Sevastopol and Novorossisk, the Black Sea mouths and bases of the Russian Black Sea fleet. Their importance is overwhelming, because the Black Sea is the direct route from the Danube to Batum, and therefore the oil route from Caucasia to Central Europe.

(4) Moscow, because it is the hub of all Russian communications west of the Urals, and is linked to the Caspian Sea by way of Volga Canal. When war broke out plans were in hand to link it by canals with the Baltic and the Black and White Seas.

Because of these strategical centres, automatically it followed that three groups of armies were formed to protect them—namely, in the north Voroshilov's, in the centre Timoshenko's, and in the south Budyonny's. Against these the Germans also massed three, in order from north to south—von Leeb's, von Bock's and von Rundstedt's. The difference between these opposing groupings was that, whereas the three German armies constituted a trinity in unity, the three Russian were but a triplicity, each army working on its own. On the one side we find a unifying offensive plan, on the other merely stubborn, unco-ordinated resistance, with the result that each Russian army was hammered in turn.

It is not my object here to follow the campaign in detail, nor do I believe it to be as yet possible, because the misrepresentations which surrounded it are as enormous as is the campaign itself. All that a writer can at present do is to read between the lines of the official reports, keep his eyes riveted on the map, and constantly cast his mind back to the theory of machine warfare as outlined in Part II, for whether it is sound or rotten it is at least some guide.

To begin with, it would seem to me that the German grand tactical plan was somewhat as follows :

(1) To drive back Timoshenko in the centre in order to separate the two wings—the groups of armies on his right and left.

(2) To turn on the northern wing under Voroshilov, smash it and occupy Leningrad.

(3) Should Timoshenko not by then have recovered, to turn on Budyonny—the southern wing—occupy Kiev and the Crimea and drive his group of armies over the Dnieper.

(4) Next, a concentric attack by von Leeb's group of armies—now based on Leningrad—and von Bock's on Moscow, in order to pinch out Timoshenko's group and occupy the capital.

(5) This to be followed by another concentric attack, this time on Budyonny's group, carried out by all three German armies, its object being to win a stupendous Cannae or Sedan somewhere within the great bend of the Volga.

(6) Next, to advance to the line of the Volga from Kazan to Astrakhan, hold it defensively and then turn everything south on Caucasia, and lastly link up the forces operating there with their home base by way of the Black Sea and the Danube.

If the German plan was anything like this, then to date (November, 1941), it has seriously miscarried, and probably for the following reasons :

(1) The Russians have fought more stubbornly than was expected.

(2) The resistance of Leningrad has seriously impeded the development of the encirclement of Timoshenko's group of armies.

(3) The Germans, though well organized to overcome a non- or semi-mechanized enemy, were not correctly organized to meet a mechanized one.

(*a*) Their armoured divisions did not include a fully organized anti-tank wing, and

(*b*) The bulk of their supply vehicles were wheeled and not tracked, and therefore their system of supply was tied to the indifferent Russian roads.

I will refer to these defects a little later on.

When examining the tactics of this vast campaign, or rather series of campaigns, I am of opinion that the future historian will decide that its key is to be discovered in the word "Salients"—their creation, their attack and their defence. Some have been of truly gigantic proportion. Thus, when during the latter part of September Budyonny's group of armies was largely swept up, the salient he occupied stretched from about Snovsk (50 miles south-east of Gomel) via Chernigov to Borodyanka (25 miles north-west of Kiev) to Byelaya-Tserkov (40 miles south of Kiev) to Dnepropetrovsk. Therefore, as the crow flies, its northern flank was 120 miles in length, its snout 60 miles, and its southern flank 240 miles. That

is, as extensive as the whole of the Western Front in France stretch- from Douai to Mant s (30 miles north-west of Paris) to Pithiviers (50 miles south of Paris) and thence to within a few miles of Basle in Switzerland.

Though this is the greatest salient as yet attacked, most were of gargantuan size when compared to anything seen on the Western Front.

With this picture in mind, I will now turn to the opening phase of the campaign and attempt to show how these salients originated, and then how they influenced tactics.

To begin with, it must not be assumed that, in spite of the immense forces engaged, on so extended a front as stretched from Memel on the Baltic to the mouth of the Danube 1,500 miles in all—there was any semblance of solidity. Further, as this front was largely unfortified, and as infantry cannot resist determined tank attacks, and as the German armoured divisions were few in number—possibly twenty in all—the side which first assumed the offensive as the Germans did, by breaking through the enemy infantry, or entering vacant spaces, rapidly created a series of salients. Each appears to have been the result of a pair of well-spaced armoured attacks, which drove all before them and simultaneously *left all between them behind*. The problem then became one not of continuing to advance, but of how best to force the surrender or "invade" and reduce the tactical islands which had been left in rear.

It would appear that the Germans, thorough though they are, were surprised by this situation, and in consequence not prepared to meet it. In France the mere threat of encirclement had frequently forced surrender; yet in Russia a total encirclement did not. Why? In my opinion because not only were the distances and the size of the salients greater, but as the troops cut off within them were highly mechanized, unless the attackers could, in order to rest, refit and refuel, or when met by superior numbers, fall back on a defended base, they had no choice left them but to withdraw. This happened quite early in the campaign during the first advance on Kiev, and no doubt also on other occasions.

In order successfully to carry out the boxing up tactics two things were necessary—namely, that the German armoured forces could hold the field until the motorized troops caught them up, and that they could be supplied across country.

Now these were just the two operations which their organization did not permit of. Their armoured divisions possessed no fully organized anti-tank wings, and the bulk of their supply vehicles was wheeled and not tracked, and in consequence was road-tied. Had anti-tank wings existed then for days on end the

sally parties—the tank wings—could have held the field and continued to operate against the rear of the islands until the motorized troops came up to invest their front and flanks. Further, could they have been supplied by cross-country vehicles and could the motorized troops have been transported in the same, the boxing-in of the islands would have been far more rapid and effective. It was this lack of power to hold their enemy in the salients formed which deprived so many of these German rear attacks of their completeness.

I will now turn to the Russians. Though their grand tactics were lamentable, their minor tactics would appear to have been of a high order, and their refusal, when surrounded, to become "rattled" altogether admirable. Nevertheless, though on occasions they have counter-attacked with determination, up to the time of writing (November, 1941) no great combined offensive has been attempted. The reason for this is, I think, that, throughout their history, the Russians have proved themselves to be not so much an offensively or defensively as a nomadically-minded people. Their vast empire has been absorbed rather than conquered, not by attack and defence, but by steady percolation. In the fifteenth century they set out from their land-locked "island" of Muscovy, and by swarming forwards whenever their enemy's resistance was weak, and backwards when it was strong, they succeeded in establishing the greatest Continental Empire since the days of Jenghiz Khan. They advanced against weakness and retired before strength until their enemy was so exhausted by following them up that they could once again right-about-turn and swarm over him.

This Oriental system of waging war sprang naturally from the vastness of Russia herself. Yet, as I have shown, the mechanization of her agriculture had from the strategical point of view, and be it remembered food is the basis of strategy, shrunk this vastness into a comparatively small area—Caucasia. Further still, the westernization of the Russian army through mechanization confused rather than strengthened the Russian traditional method of fighting. This, I think, is clearly seen in every Russian operation so far carried out. They have been neither percolative, offensive nor defensive, but rather a mixture of all three. Thus it has come about that, in spite of stubborn fighting, one disaster has followed another because, when met by strength, the Russian soldiers have preferred to resist rather than swarm back, or because the German advances were too rapid for them to do so, large forces have been locked up as in Minsk, Kiev, Odessa, Leningrad and elsewhere, which have been forced to surrender or are still invested. This is not percolation: this is stagnation leading to inevitable evaporation. There-

fore the truth would appear to be that, though in this machine age it was inevitable that the Russians would have to accept mechanization, their vast oil supplies have rendered the transformation so rapid that a change in mentality has not been able to keep pace with it. This, coupled with the fact that strategically the vast Empire of the former Tsars has shrunk to the size of France, has to a large extent rendered nomadic or percolative methods of waging war less formidable. In fact, one cannot help feeling that, anyhow, for the time being, military mechanization has on both sides largely failed in Russia.[1] In turn, this, I think, is the reason why so much has been heard about those de-mechanizers, Generals Mud, Frost and Snow and so little of Generals Advance, Attack and Assault. Not because the Popular Press realizes what it is writing about, but because, long before the days of mechanization Mud, etc., when under the direction of Field-Marshal Unlimited Space, were the most formidable of all adversaries. Nevertheless, even to-day they are no mean foes; therefore it is of importance to examine their influences on machine warfare.

Of the three famous generals, Mud is the most formidable, and for the identical reason which held good in Napoleon's Polish campaigns—namely, that it slows down and frequently brings to a halt all road movements.

Examining this subject in the *Evening Standard* of August 16, 1941, I wrote:

> "Supply, more so than tactics, decides every war. In the last one it was the Midlands which fought the Ruhr, and because its operations were almost static, victory was ultimately decided in the workshops. But this present war is a mobile affair. Therefore to the contest between industrial areas must be added the contest between communications—those rivers of supply which empty themselves into the lakes we call 'armies' in which their sustaining waters are evaporated by conflict.
>
> "So important is this rear battle that I will go so far as to say it constitutes at least 75 per cent of the war problem of each

[1] Since these words were written the winter campaign has been fought, and though the persistence of the Russians and the endurance of the Germans is beyond question, so far as I can read between the lines of the official reports its strategical results have been negligible: (1) Because on account of the German fortified areas the Russians have been unable to put into full practice their percolative tactics, and (2) because the mechanized forces on both sides, not having been fashioned for winter operations, have largely been at a discount. This second point is in part at least corroborated by the reports, for in them the tank losses mentioned are insignificant when compared to those claimed during last summer's fighting (March 31st, 1942.)

belligerent, as it did 129 years ago, when Napoleon marched on Moscow.

"It was not so much the burning of that city which caused Napoleon's defeat; instead, the neglect to shoe his transport animals. This led to thousands going lame and to prolonged delays at Smolensk and other places. Then came winter to wrap the Grand Army in its shroud of snow.

"The point to note is: had Napoleon fitted the hoofs of his horses, mules and oxen to the conditions they were called upon to meet—that is, had he kept these animals properly shod—the chances are he would not have been defeated.

"Strange to say, at the moment I write, this same oversight is once again cropping up. Instead of hoofs we have caterpillar tracks, for be it remembered that the cutting edge of an army now runs on endless chains of linked steel plates, and not on endless horse shoes and hobnails.

"In Napoleon's day it was not the breakdown of his cavalry horses which delayed him; but the collapse of his transport animals. To-day it is not the fighting units of the Panzer Divisions which have proved defective, but instead their supply columns. . . ."

In spite of the magnificent Todt Organization, which more than any other factor has rendered the German advance into Russia possible, the true answer to foundering roads is not macadam but tracked vehicles, because they can leave the roads and move across country. Though I have mentioned this before, it is a point which cannot too frequently be driven home, because in machine war it is a fundamental necessity.

So long as army vehicles remain wheeled, any change in routes and time tables—such as switching from one set of roads to another—is in every case a major administrative problem, and more often than not an exceedingly delicate one.

"Now if in the middle of such a change-over, forced upon the supply system by tactical circumstances, rain and mud are introduced, the inevitable result is that the whole organization will be slowed down by lorries, etc., becoming ditched and by roads becoming blocked. It is not so much that the cutting-edge of a mechanized army is affected, for so long as swampy ground is not encountered, tracked vehicles are not unduly impeded by rain.

"It is that the supplies behind them—their blood-transfusions—are either cut off altogether or delivered so late or irregularly that tactical plans may at any moment be upset.

Rain and mud, therefore, by slowing supply simultaneously slow down command and frequently throw it completely out of gear. . . ." (*Evening Standard*, August 2, 1941.)

Another road difficulty is dust, which at times may be quite as disastrous as mud. For instance, in the Italo-Abyssinian War the vehicles in the Italian supply columns were spaced at from thirty to forty yards. But when moving along the mountain roads the dust was so dense that often intervals had to be opened out to ten times these distances, and, if they were not, the risk of plunging over precipices at the hair-pin bends was increased several hundreds per cent.

Worst of all, from the machine point of view, is the combination of frost and mud. The reason is that, when this marriage is consummated, the freezing up of their tracks renders tanks almost as useless as the seizing-up of their engines. What happens is that the whole of the track system—track plates, links, rollers, springs, etc.—becomes a solid mass of steel and ice, which, when the engine is started up and the clutch let in, either stops the engine or results in the tracks flying to pieces as if made of glass. Even in France during the last war frozen tracks became a major tank winter problem, which was solved by mounting a Heath Robinson contraption in an old tank, trundling it round from one machine to the other and thawing-out their frozen tracks by a jet of superheated steam.

The moral of all this is: That as uniformity of command is essential in war, as also is uniformity of fighting power, to make the trinity complete, uniformity of means of movement must be added to them.

Having now through the mists of uncertainty, lies and vituperations carried the shadow of this greatest campaign in modern history down to the last days of November, 1941, I do not intend to speculate on its outcome. Its future is on the lap of the gods; they alone can fathom its destiny. Yet to conclude with, I would like once again to point out that vast though the struggle in Russia is and vast though its influences will be, the fact nevertheless remains that it is but a side issue to Herr Hitler's main problem—How to get at England. It is no more than an indirect approach to the answering of that question. An answer which, so it seems to me, must be sought in one of three directions, single, or combined—namely (1) Invasion or physical collapse; (2) Starvation or economic collapse, and (3) The conquest of the Near East or moral collapse

Chapter XVIII

MULTIPLES OF VICTORY

THE MULTIPLES OF VICTORY ARE THOSE FACTS EXPERIENCE AND reflection have revealed to us, which when multiplied and not merely added together produce a more perfect mental environment to work in. More crudely put, they are the lessons of war and of the study. Here are a few which during the war from time to time I have jotted down:

(1) "Let us be backed with God, and with the seas
Which He hath given for fence impregnable,
And with these helps only defend ourselves,
In them and in ourselves our safety lies."

(2) The war strength of a nation is not to be measured in miles or heads, but in terms of courage, resources and machinery. Though it is not possible to beach a fleet by bailing out the ocean, it is possible to beach an army by depriving it of its oil.

(3) The object of the military organizer is to obtain the highest output of machine power from the lowest operative man power. Fighting power is multiplied by equipment and not by heads. He who in war counts heads will soon lose his own.

(4) Time is the governing factor in machine warfare. Armies can no longer be improvised, therefore they must be manufactured in peace time. In war tactical adjustments should be made during the pauses between operations. When fighting ceases, preparation begins.

(5) In total war a nation can only be fully organized when all freedom is exorcised. Its blue-print is that of a factory under martial law. Logically it follows that all who are incapable of fighting or working should be liquidated.

(6) In total war strategy in itself is self-sufficient, and therefore on no account should it be contaminated by religion, chivalry, morality, politics or sentiment. Its driving force is animalism raised to the *n*th degree. Look around and read the headlines.

(7) The aim in total war is to transform man into the total beast. This is effected through revolution—the toxin of defeat—which so poisons an enemy nation that it sickens into an anarchic delirium in which it tears itself to pieces.

(8) To learn from your enemy is one thing, to copy him is quite another. The copyist will sometimes sell his fakes at a profit, but more often than not his unimaginative works of art end

in the attic or the cellar. Begetting children by proxy is a poor game.

(9) Armies are rendered short-sighted by victory and long-sighted by defeat. He who wins the last war as often as not loses the next, because success is like a school diploma and failure like a birch rod. Disaster is the most persuasive of all masters.

(10) Between 1919 and 1939 the victorious English spent millions on experimental work in order to delay going into production, whereas the victorious French sought in *La Grande Muraille de la Chine* the contraceptive of defeat. Both had been emasculated by victory.

(11) Soldiers and monks find comfort in dogmas and rituals. They blunt their minds by repeating platitudes and squander their time in writing manuals to justify their ignorance and relieve their fraternity from the terrors of thinking.

(12) History is firstly a record of character, therein is to be sought its value. It shows us what nations are intrinsically worth: whether they are brave or cowardly, treacherous or trustworthy. In this respect history is the mirror of the future.

(13) History is secondly a record of personalities—the sieve which sorts the Man from the men. It, therefore, enables us to discover the ingredients of leadership, the greatest of which is the faith of the leader in himself, and next to it, his power to make his followers believe that he is a magician.

(14) History is thirdly a record of experiments, each made in a given set of circumstances. In this respect it teaches us that unless circumstances are identical experiments cannot be repeated. To attempt to do so is the experiment which always fails.

(15) To-day the most profitable wars to study are those of the Middle Ages, because armour then ruled the field. The art of war was in those days of a higher order than at any time since the ending of the Classical Age. The return to armour heralded the Renaissance.

(16) Nothing unifies a nation more rapidly than a common danger. Religious differences, political bickerings, economic interests and all those things which separate a nation in peace dwindle into insignificance when the Ship of State plunges towards the rocks.

(17) Security is the antithesis of heroism. The wild boar in the jungle is a noble beast, yet the pig in its sty is utterly ignoble. Its one thought is swill and its sole end is bacon. Look at Napoleonic and Bourgeois France!

(18) The language of Billingsgate befits a fishwife but not a states-

man. When the latter resorts to it, it is a sure sign of his impotence. By incantations he seeks what alone can be attained by action. To call a dog dirty will not scrub the doorstep.

(19) Age is apt to petrify the imagination and create idols out of past experiences. The failure of old generals is not to be discovered in what they have forgotten, but in that they cannot forget. Their minds become blank files marking time on dead issues.

(20) Whereas the purpose of the machine is to establish unity of action out of diversity of parts, the aim of the general is to create diversity of action out of unity of thought. The more mechanical war becomes the less mechanical must the soldier be.

(21) As death is the supreme sacrifice in war, killing has become the supreme object. Yet a moment's thought will reveal that a panic which bolts an army is more effective than a bullet which blots out a man. The true object of battle is, therefore, disorganization through demoralization.

(22) Weapon power is never unlimited, therefore the less it is expended on secondary targets the more it can be concentrated on primary. Do not strike at your enemy's toe if you can shoot him through the head. The head of an army is its command.

(23) Because in a duel my adversary wounds me in the big toe or in my little finger, should I, therefore, on the principle of a toe for a toe and a finger for a finger aim my next shot at his feet or hands? Yet this is what the people cry for.

(24) Battles are firstly the clash between two brains and only secondly the clash between two bodies. If the brain is paralysed the body will become inarticulate, and if the body is destroyed cell by cell the brain will lose its power. Which is the more speedy?

(25) In this present age a people's war is one in which the people do everything except fight, and believe me that makes all the difference. If battles could be won by headlines there would soon be no soldiers left in the world.

(26) There is such a thing as discipline. Once it was the perquisite of armies, to-day, in this age of total war, it is the backbone of nations. The first sign of national discipline is not that the people obey, but that they cease to command.

(27) All warfare is retaliation, all acts of war are reprisals, and everything belonging or appertaining to the enemy is a legitimate military objective. Nevertheless they vary in importance, and the test of generalship lies in their choice.

(28) Good and evil things are for parsons. Actual and tangible things are for soldiers. Therefore in heaven's name let us cease mixing theology with strategy and politics with tactics. Again, let the people and their leaders heed this advice.

(29) The army of a Continental Power is measured by the fecundity of its women, that of an Oceanic Power by the tonnage of its ships. For us the most encouraging sight is a ship in full sail, for our enemy a woman in child.

(30) There are three essentials in fighting—namely, how to guard, how to hit, and how to move. Add to these discipline, the moral element; supply, the material element; leadership, the intellectual element; and faith in the cause, the spiritual element, and we have before us the entire galaxy of war in all its sparkling variations.

(31) If by nature a girl is so fashioned that she demand a toreador as husband, it is senseless for her to seek a mate among village curates. *Ergo*, the kind of war a nation can the more happily wed is one which fits its character.

(32) The barbaric principle of an eye for an eye and a tooth for a tooth appertains to the Old Testament of War and not to the New. Let us remember that, as one day the world at large will have to live with the victor, to fight cleanly is more likely to win its applause.

(33) The theory of the attack on the civil will is radically a false one; because, so long as the armed forces of a country are loyal to their government, however intense frightfulness is the people cannot revolt.

(34) The true objects of air attack are: (1) to unhinge military operations, and (2) to disorganize or slow-down work. Destruction and killing should therefore be measured by these ends and not be looked upon as ends in themselves.

(35) In war, as in social life, familiarity breeds contempt. It is the unorthodox and therefore the heretical which so frequently succeeds in battle. Stratagems are as necessary as strategy.

(36) Here is a lesson for the citizens of every country: In total war the ultimate factor which decides victory or defeat is not the will but the behaviour of the mass of the people.

(37) Ships, more ships and yet more ships is England's supreme need, and not more aircraft, more tanks or more armed men. Though these things are highly desirable, ships are essential, for food is the foundation of strategy and of life.

(38) Main blows, no side shows. When in doubt, hit out. Never risk your pants for a trouser button. Never guarantee a powder factory full of maniacs. All things are possible, even the impossible—remember Crete and Norway.

(39) Though the people can be fooled all the time, you cannot miss your bus all the time, unless you intend to walk to your destination. Remember—though this is a talking it is not a walking age.

(40) Nations are governed by self-interest and not by altruism. They will support each other when it suits their purpose, and abandon each other when it seems to their advantage. At best, international honour is rolled gold.

(41) This is a food war and all that those two words imply—more fields, more crops, more ships, more exports, more imports, fewer frontiers. These things are related to our stomachs, that great power-house of war. True, man cannot live by bread alone; nevertheless he will fight for half a loaf.

(42) A virile nation demands leadership and not grandmothership. Therefore we are tired of the Valour of Ignorance, therefore we want the Sword of Truth. Our needs are deeds and not screeds. We are sick to death of the hire-purchase system of buying our loyalty in monthly instalments. We ask for marching orders.

(43) Let us remember this—in 1618, or thereabouts, the Emperor Ferdinand II proclaimed: "Better a desert than a people ruled by heretics." By 1648, when the Thirty Years' War ended, Europe was a desert and heresy remained. No sooner was the Peace of Westphalia signed than France was swept by the Fronde, and in Whitehall Charles I's head rolled into the executioner's bucket.

(44) Growing corn is warehoused by God, and as a herd of cattle is mobile it is more self-protective than any cold storage house. Though cows will scatter, carcasses won't. The life of a nation is in the quick and not in the dead.

(45) Crete has fallen as Troy once fell, yet in eleven days instead of eleven years. Such is the measuring rod of Time in the development of tactics during the last thirty centuries. Stranger still it was from Crete that Daedalus made his famous flight.

(46) To-day there is no longer such a thing as a line of defence, for we live in a cubic military space in which attack may come from any direction; therefore defence must be in all directions. Did not the knight in his armour prove that?

(47) As speed of attack increases, so must the soldier rely as much on his wits as on his orders. Henceforth he must think like lightning and strike like lightning. More and more must he become his own general. To-day Intelligence is in line with Pugnacity and Resistance.

(48) We must keep our heads cool and our hearts aflame. Yet

never must we let our hearts set fire to our heads, because our heads are the stokers of our hearts—the furnace whence our moral energy is derived.

(49) Tactics are an art and not a dodge. They consist in compounding the powers of a number of weapons, and not in the exploitation of a single weapon. It is by multiplication and not by addition that tactics are made.

(50) The elemental gods must be propitiated and not cursed. Mud, Dust, Snow, Heat, Frost Fog and Rain cannot be banished by incantations; only by inventions can their evil powers be exorcised.

(51) Supply, more so than tactics, decides every war, for the bloodless battle of the roads is the foundation of the bloody battle of the fields. Food is the foundation of life, therefore supply is the governing factor in tactics. The rolling kitchen is the complement of the limber.

(52) Like the proverbial ostrich, how often do we thrust our heads under the sands of illusion, and suffer our fine feathers to be wrenched from out our tails. Tails up, heads high and then forwards.

(53) In war the wickets are the opposing armies, not the cities and industrial areas they protect. These are the cricket pavilions overlooking the pitch called battle. Each set of bails sent flying brings us a step nearer to a deck chair and a long drink.

(54) In war there is such a thing as morale, not only military but also national. For short spells it can be stimulated by the dope of propaganda. Yet, like a drug, the more swallowed the more has to be swallowed until it ceases to work. There is no substitute for victory.

(55) Look at things through the eyes of the soldier and not through those of the ecstatic or the exorcist. War is not magic, wishful thinking is. Wars are no longer won by examining the entrails of fowls or by any such like geomancy. Yet the people think so.

(56) There is no other way except that of the bloody path to Victory. When the scribblers set out to chalk Vs on their neighbours' doors instead of their own, it would be as well—anyhow for the paint—that they remember that Victory is written in letters of blood.

(57) It is not killing Germans which should be our aim. Instead, it is to compel our enemy to increase his lines of communication troops. An advancing army is like a piece of elastic. The more it is pulled out from its base the nearer its communications approach snapping point.

(58) In war nothing much matters except at the vital point. And at that point nothing so much matters as the fulfilment of the vital idea. What is the problem? This. . . . ! Then abide by it and see that others abide by it also.

(59) "War means the assassination of truth." So wrote Georg Brandes. Then every falsehood is a self-inflicted wound. To talk bunkum ends in becoming bunkered *cap à pie*. Such is the armour the ink-slingers offer us.

(60) Dr. Inge has wittily remarked: "You have got to catch your Herr before you jug him." In cooking the uncaught Herr in our unmade peace pot, are not we also cooking the war and unmaking ourselves? Should not this cease, unless our peace aim is to become a fricassee of rabbit?

(61) "What Next?" is frequently answered by "What Last?" and what "What Last?" means is that, in the winning of this war, our traditional strategy, which in past ages time and again won through, is the more likely to win through this time. You cannot experiment with geography.

(62) Not so very long ago, as Napoleon said, an army marched on its belly. To-day it rolls into battle on its oil. Were oil suddenly to vanish every organized nation would collapse. Oil is the life-blood of the modern world.

(63) It would seem now inevitable that whenever a battle is fought two are reported. First there is the Bullet Battle, a grim, often boring and not infrequently slow affair. Secondly, there is the Ballyhoo Battle, a kind of frantic scalp dance—on paper.

(64) Tank designers should never forget that in mechanized warfare comfort has a distinct tactical value. The more comfortable the crew of a tank can be made, the greater will be its endurance, both physical and moral.

(65) In the armoured battle it is the velocity and weight of the initial assault which decides. The old idea of building up the attack is therefore anathema. Hence the Advanced Guard Action becomes the deciding factor.

(66) As in machine warfare time is so often the ruling element, a superficially prepared operation is frequently to be preferred to a methodical one. To-day success in war is dependent upon action more so than on arrangement.

(67) The contest between air and sea power hinges on shrinkage rather than on sinkage. All narrow seas have become potential canals in which a fleet is placed in a defile. Who first can crown the heights will command the waters.

(68) No results other than losses can be expected by pitting manpower against machine power, or by launching into battle.

inadequate forces of armoured men. As in mechanics, tasks must be measured in terms of velocity and weight.

(69) Tanks are protected by consternation and confusion as much as by armour and fire power. Speed is the forerunner of surprise and surprise of panic. A panic-stricken army is disarmed at a single blow.

(70) "Fear is Failure and the Forerunner of Failure : Be thou therefore without Fear, for in the heart of the Coward Virtue abideth not."

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